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Kramer Electronics, Ltd.

USER MANUAL

Model:

VP-8x8TP

8x8 UXGA/Audio Matrix Switcher

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Contents

1	**Introduction**	**1**
2	**Getting Started**	**1**
2.1	Quick Start	1
3	**Overview**	**3**
3.1	Terminology Used in this User Manual	4
3.2	Shielded Twisted Pair and Unshielded Twisted Pair	4
3.3	Defining the EDID	5
3.4	The Power Connect™ Feature in the VP-8x8TP	5
4	**Defining the VP-8x8TP 8x8 UXGA/Audio Matrix Switcher**	**6**
5	**Installing the VP-8x8TP in a Rack**	**9**
6	**Connecting and Configuring the VP-8x8TP 8x8 UXGA/Audio Matrix Switcher**	**10**
6.1	Connecting the VP-8x8TP 8x8 UXGA/Audio Matrix Switcher	10
6.2	Connecting to the VP-8x8TP 8x8 UXGA/Audio Matrix Switcher via RS-485	11
6.2.1	Setting the RS-485 Bus Termination	12
6.2.2	Setting the RS-485 Bus Machine Number	12
6.3	Connecting to VP-8x8TP via the RS-232 Port	12
6.4	Configuring the Ethernet Port	12
6.4.1	Connecting via the Ethernet Port	12
6.4.2	Ethernet Port Configuration	14
6.5	Operating the VP-8x8TP 8x8 UXGA/Audio Matrix Switcher Remotely	16
6.6	Setting the Switching Delay Time	16
7	**Operating the VP-8x8TP 8x8 UXGA/Audio Matrix Switcher**	**17**
7.1	Switching Inputs and Outputs	17
7.1.1	Switching an Input to an Output	17
7.1.2	Switching an Input to all Outputs	17
7.1.3	Disconnecting an Input from an Output	17
7.1.4	Disconnecting all Inputs from Outputs	18
7.2	The 7-Segment Status Display Modes	18
7.2.1	Status Display Immediately After Power is Turned On	18
7.2.2	Status Display During Normal Operation	18
7.2.3	Status Display During Audio Level Setting	19
7.3	Confirming Settings	19
7.3.1	Toggling between the At Once and Confirm Modes	19
7.3.2	Confirming a Switching Action	20
7.4	Storing/Recalling Input-Output Configurations	20
7.4.1	Storing an Input-Output Configuration	20
7.4.2	Recalling an Input-Output Configuration	21
7.5	Locking the Front Panel	21
7.6	Choosing the Audio-Follow-Video or Breakaway Option	21
7.6.1	Setting the Audio-Follow-Video Option	22

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7.6.2	Setting the Breakaway Option	22
7.7	Setting the Audio Input Gain	22
7.8	Using the IR Transmitter	23
8	**Operating Multiple VP-8x8TP Units Remotely via RS-232**	**23**
9	**Operating the VP-8x8TP Remotely via your Web Browser**	**24**
9.1	Connecting to the VP-8x8TP via your Browser	25
9.2	The Main Switching Matrix Page	26
9.2.1	Switching an Input to an Output	27
9.2.2	Setting the AFV Mode	28
9.2.3	Operating in the Offline Mode	28
9.2.4	Storing and Recalling Setups	29
9.2.5	Locking the Front Panel Buttons	31
9.3	Audio Input Gain Control Page	31
9.4	The Configuration Page	32
10	**EDID**	**33**
11	**Firmware Upgrade**	**33**
11.1	Wiring the TP RJ-45 Connectors	34
12	**Technical Specifications**	**35**
13	**Default Communication Parameters**	**35**
14	**Default EDID**	**36**
15	**Tables of Hex Codes for Serial Communication (Protocol 2000)**	**38**
16	**Kramer Protocol**	**39**
16.1	Switching Protocols	40
16.1.1	Switching Protocols via the Front Panel Buttons	40
16.1.2	Switching Protocols via Protocol Commands	40
16.2	Kramer Protocol 3000	40
16.2.1	Protocol 3000 Syntax	40
16.2.2	Command Parts Details	41
16.3	Kramer Protocol 2000	47

Figures

Figure 1: VP-8x8TP 8x8 UXGA/Audio Matrix Switcher Front Panel 6
Figure 2: VP-8x8TP 8x8 UXGA/Audio Matrix Switcher Rear Panel 6
Figure 3: Connecting the VP-8x8TP 8x8 UXGA/Audio Matrix Switcher 10
Figure 4: The RS-485 TERM Dipswitch 12
Figure 5: Local Area Connection Properties Window 13
Figure 6: Internet Protocol (TCP/IP) Properties Window 14
Figure 7: Connect Window 15
Figure 8: Device Properties Window 16
Figure 9: Status Display Five Seconds After Turn On 18
Figure 10: Status Display During Normal Operation 18
Figure 11: Status Display Showing INPUT 3, Gain -4.5 19

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Figure 12: Storing and Recalling using the Input-Output Buttons 20
Figure 13: Status Display Showing Audio Gain for Input 3, Gain -4.5 22
Figure 14: Control Configuration via RS-232 and RS-485 24
Figure 15: Java Test Page Success Message 24
Figure 16: Entering the IP Number in the Address Bar 25
Figure 17: The Loading Page 25
Figure 18: First Time Security Warning 26
Figure 19: Main Switching Matrix Page 26
Figure 20: Selecting a Switching Point on the Matrix 27
Figure 21: Switching an Input to an Output 27
Figure 22: AFV Mode Warning 28
Figure 23: AFV Mode Audio Channels Switched 28
Figure 24: Switching Audio in the Offline Mode 29
Figure 25: Exiting Offline Warning 29
Figure 26: Selecting Preset 07 30
Figure 27: Selecting Preset 03 30
Figure 28: Recalling a Preset in Offline Mode 31
Figure 29: Audio Gain Control Page 31
Figure 30: Selecting Audio Input Gain for Channel 2 32
Figure 31: Configuration Page 32
Figure 32: TP Pinout Wiring 34

Tables

Table 1: Terminology Used in this Manual 4
Table 2: VP-8x8TP Front and Rear Panel Features 7
Table 3: Technical Specifications of the VP-8x8TP 8x8 UXGA/Audio Matrix Switcher 35
Table 4: Default Communication Parameters 35
Table 5: VP-8x8TP Video Signal Codes 37
Table 6: VP-8x8TP Audio Signal Codes 38
Table 7: VP-8x8TP Audio Input Gain Codes 38
Table 8: VP-8x8TP Hex Codes for Switching Video Channels 38
Table 9: VP-8x8TP Hex Codes for Switching Audio Channels 38
Table 10: VP-8x8TP Hex Codes for Increasing/Decreasing the Audio Input Gain 39
Table 11: VP-8x8TP Hex Codes for Setting the Audio Input Gain 39
Table 12: Instruction Codes for Protocol 3000 42
Table 13: Protocol Definitions 47
Table 14: Instruction Codes for Protocol 2000 48

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1 Introduction

Welcome to Kramer Electronics! Since 1981, Kramer Electronics has been providing a world of unique, creative, and affordable solutions to the vast range of problems that confront the video, audio, presentation, and broadcasting professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better! Our 1,000-plus different models now appear in 11 groups[1] that are clearly defined by function.

Congratulations on purchasing your **VP-8x8TP** *8x8 UXGA/Audio Matrix Switcher*, which is ideal for the following typical applications:

- Professional display systems requiring a true 8x8 computer graphics and audio matrix operation
- Long range multimedia and presentation source and acceptor selection

The package includes the following items:

- **VP-8x8TP** *8x8 UXGA/Audio Matrix Switcher*
- **K-Router** Windows®-based Kramer control software[2]
- Kramer **RC-IR3** Infrared Remote Control Transmitter (including the required battery and a separate user manual[4])
- Power cord[3] and this user manual[4]

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual
- Use Kramer high performance high-resolution cables[5]

2.1 Quick Start

This quick start chart summarizes the steps for basic setup and operation.

1 GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Routers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity; GROUP 10: Accessories and Rack Adapters; GROUP 11: Sierra Products

2 Downloadable from our Web site at http://www.kramerelectronics.com

3 We recommend that you use only the power cord that is supplied with this machine

4 Download up-to-date Kramer user manuals from http://www.kramerelectronics.com

5 The complete list of Kramer cables is available at http://www.kramerelectronics.com

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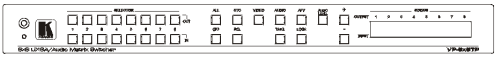
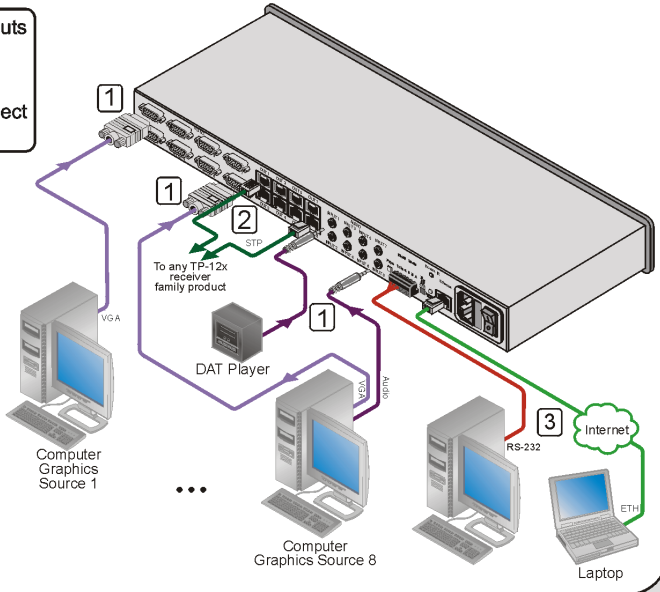
Step 1: Mount the machine - see section 5

Mount the machine in a rack or stick the 4 rubber feet to the underside



Step 2: Connect the inputs and outputs - see section 6

1. Connect the inputs
2. Connect the outputs
3. Optional - Connect a controller



Step 3: Turn the power ON

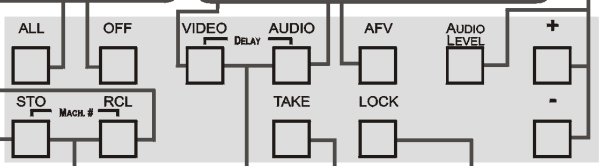
Step 4: Operate the machine - see section 7

Use the SELECTOR buttons to switch the inputs to the outputs

(ALL) Connect a selected input to all the outputs; (OFF) disconnect an output from an input

VIDEO - Switching relates to the video signal
AUDIO - Switching relates to the audio signal
AFV - Audio follows video when switching

Increase or decrease the AUDIO LEVEL



Store (STO) or Recall (RCL) the status

Read the status and the relative audio level on the 7-segment display

Press STO and RCL together to set the unit #

Press VIDEO and AUDIO together to set the DELAY time

Press TAKE to implement a sequence of key strokes

LOCK the front panel

Operate via the front panel buttons, RS-232, RS-485 and/or the Ethernet

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3 Overview

The **VP-8x8TP** is a high performance 8x8 computer graphics video and audio matrix switcher for high resolution video and stereo audio signals. The **VP-8x8TP** is HDTV compatible and lets you route any combination of inputs and outputs over TP (Twisted Pair) cable to compatible TP receivers.

In particular, the **VP-8x8TP** *8x8 UXGA/Audio Matrix Switcher* features:

- Kramer's innovative integrated sync processing **Kr-isp**® technology that lets you achieve a sharp, stable image when the sync level is too low, by restoring the sync signal waveform
- Resolution up to UXGA (1600 x 1200), 1080p
- Support for component video with suitable breakout cables[1]
- 16 preset memory locations for quick access to common video and audio configurations and audio gain status for each output
- Automatic detection of the connected input signals (the respective button lights)
- A delayed switching mode (ranging from 0 to 3.5sec[2]) for clean transitions (seamless switching) when switching between non-genlocked sources
- DC-coupled video inputs and outputs
- Audio-follow-video and breakaway options
- Eight stereo unbalanced audio input signals on 3.5mm mini jacks
- Eight RJ-45 STP/UTP output connectors
- Over 100m (330ft) transmission range between the switcher and the TP receiver
- Audio level control buttons for adjusting the signal level of each input
- Measurement and indication of the audio level for each input and output, in relative dB
- A TAKE button, which allows you to place multiple switches in a queue and then activate them simultaneously with one touch of this button
- A LOCK button to prevent tampering with the front panel

The **VP-8x8TP** can be controlled using the front panel buttons, or remotely via:

- RS-485 or RS-232 serial commands (using Kramer 2000 and 3000 Protocols) transmitted by a touch screen system, PC, or other serial controller
- The Kramer infrared remote control transmitter or infrared remote extension cable transmitter (optional)
- A Web browser over Ethernet

The **VP-8x8TP** is dependable, rugged, and fits into one vertical space (1U) of a standard 19" professional rack**.**

1 For example, C-GM/5BM. The complete list of Kramer cables is available at http://www.kramerelectronics.com

2 In increments of 0.5sec

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To achieve the best performance:

- Use only good quality connection cables[1] to avoid interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables)
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality and position your Kramer **VP-8x8TP** away from moisture, excessive sunlight and dust

3.1 Terminology Used in this User Manual

Table 1 defines some terms that are used in this user manual.

Table 1: Terminology Used in this Manual

Term	Definition
802.3	The standard specification for Ethernet that is maintained by the Institute of Electrical and Electronics Engineers (IEEE).
Dynamic Host Configuration Protocol (DHCP)	Allows the network administrator to distribute IP addresses from a central point and automatically send a new IP address when an Ethernet point is plugged into a different network location.
Gateway	A network position serving as an entry to another network. On the Internet, a node or stopping point can be either a gateway node or a host (end-point) node.
IP Address	A 32-binary digit number that identifies each sender or receiver (within a network via a particular server or workstation) of data (HTML pages or e-mails) that is sent in packets across the Internet. Every device connected to an IP network must have a unique IP address. This address is used to reference the specific unit.
Local Area Network (LAN)	Computers sharing a common communications line or wireless link, which often share a server within a defined geographic area.
Media Access Control (MAC) Address	A computer's unique hardware number (or address) in a LAN or other network. On an Ethernet LAN, the (MAC) address is identical to the Ethernet address.
Transmission Control Protocol/Internet Protocol (TCP/IP)	The basic communication language or protocol of the Internet that breaks the message into appropriately sized packets for the network, and can be used as a communications protocol in an intranet or an extranet.

3.2 Shielded Twisted Pair and Unshielded Twisted Pair

We recommend that you use Shielded Twisted Pair (STP) cable. There are different grades of STP cable available, and we advise you to use the best quality STP cable that you can afford. Our non-skew-free cable, Kramer **BC-STP** is intended for digital signals and for analog signals where skewing is not an issue. For cases where skewing occurs, our UTP skew-free cable, Kramer **BC-XTP**, may be used. Bear in mind, though, that we advise using STP cables where possible, since the compliance to electromagnetic interference has been tested using STP cables.

Although Unshielded Twisted Pair (UTP) cable might be preferred for long range applications, UTP cable should be installed as far as possible from electric cables, motors, and so on, as these devices tend to create electromagnetic interference. However, since the use of UTP cable might not conform to electromagnetic standards, Kramer does not commit to meeting the standard with UTP cable.

1 Available from Kramer Electronics on our Web site at http://www.kramerelectronics.com

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3.3 Defining the EDID

The Extended Display Identification Data (EDID[1]) is a data-structure, provided by a display, to describe its capabilities to a graphics card (that is connected to the display's source). The EDID enables the PC or laptop to "know" what kind of monitor is connected to the output. The EDID includes the manufacturer's name, the product type, the timing data supported by the display, the display size, luminance data and (for digital displays only) the pixel mapping data.

3.4 The Power Connect™ Feature in the VP-8x8TP

The Power Connect feature applies as long as the cable can carry power. This feature is available when using STP cable and the distance does not exceed 50m (164ft) on standard CAT 5 cable. For longer distances, heavy gauge cable should be used (CAT 5 cable is still suitable for the video/audio transmission, but not for feeding the power at these distances). For units which are connected via RJ-45 connectors, make sure that the shield of the STP cable is connected to the metal casing of the connectors on both ends of the cable. For units which are connected via terminal block connectors, the shield of the STP cable must be connected to a ground terminal on the units at both ends (use the ground terminal of the power supply connection if necessary).

For a CAT 5 cable exceeding a distance of 50m, separate power supplies should be connected to the receivers simultaneously.

Note: The transmitter can supply power to the receiver but not visa versa.

1 Defined by a standard published by the Video Electronics Standards Association (VESA)

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4 Defining the VP-8x8TP 8x8 UXGA/Audio Matrix Switcher

Figure 1 and Table 2 define the front panel of the **VP-8x8TP** *8x8 UXGA/Audio Matrix Switcher*.

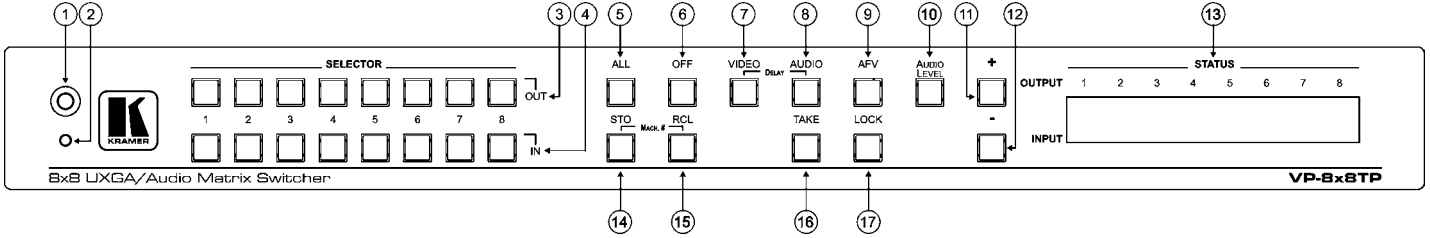

Figure 1: VP-8x8TP 8x8 UXGA/Audio Matrix Switcher Front Panel

Figure 2 and Table 2 define the rear panel of the **VP-8x8TP** *8x8 UXGA/Audio Matrix Switcher*.

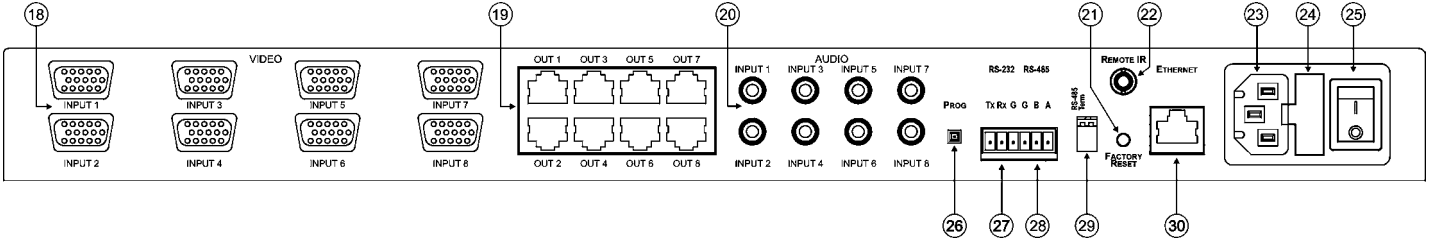

Figure 2: VP-8x8TP 8x8 UXGA/Audio Matrix Switcher Rear Panel

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Table 2: VP-8x8TP Front and Rear Panel Features

#	Feature		Function	
1	IR Receiver		Receiver for the infrared remote control transmitter	
2	IR LED		LED lights yellow when the unit receives IR commands	
3	*SELECTOR OUT* Buttons		Press to select the output[1] to which the input is switched	
4	*SELECTOR IN* Buttons		Press to select the input to switch to the output (after selecting an output). When a signal is detected on an input connector, the corresponding input button lights	
5	*ALL* Button		Press ALL followed by an INPUT button to connect that input to all outputs[2]	
6	*OFF* Button		Press an OUTPUT button and then the OFF button to disconnect the selected output from the input. Press the ALL button and then the OFF button to disconnect all the outputs	
7	*VIDEO* Button		Press to modify video related actions[3]	Press VIDEO and AUDIO together to set the video switching delay[4]
8	*AUDIO* Button		Press to modify audio related actions[5]	
9	*AFV* button		Press to make audio channels follow the video channels	
10	*AUDIO LEVEL* Button		Press to show the relative audio level on the STATUS display (see Section 7.1.2). Select an input, then use the + and – buttons to change the audio gain level	
11	*AUDIO LEVEL*	+ button	Press to increase the audio input gain[6] (first press Audio Level and then select an input)	
12		– button	Press to decrease the audio input gain[6] (first press Audio Level and then select an input)	
13	*STATUS* 7-segment Display		Displays either the input/output configuration, the audio gain setting or the firmware build and machine number (see Section 7.1.2)	
14	*STO* (Store) Button		Press STO followed by an INPUT/OUTPUT button to store the setting[7]	Press STO and RCL together to set the RS-485 bus machine number[8]
15	*RCL* (Recall) Button		Press the RCL button to cause the corresponding input/output button to recall a setup from the non-volatile memory. Press the RCL button again to implement the new status	
16	*TAKE* Button		Press TAKE to toggle between the Confirm mode[9] and the At Once mode (user confirmation per action is unnecessary). When in Confirm mode, press the TAKE button to implement a pending configuration	
17	*LOCK* Button		Press and hold to toggle locking of the front panel buttons	

1 From 1 to 8

2 For example, press ALL and then Input button # 2 to connect input # 2 to all the outputs

3 The VIDEO button lights when in breakaway mode and actions relate to video

4 See Section 8

5 The AUDIO button lights when in breakaway mode and actions relate to audio

6 In the case where the Audio Level button was pressed, and the audio level is shown on the Status 7-segment Status Display

7 For example, press STO and then the output button # 3 to store in Setup # 3, or the input button 4 to store in Setup 12

8 See Section 6.2.2

9 When in the Confirm mode, the TAKE button lights

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#	Feature	Function	
18	*VIDEO INPUT* 15-pin HD (F) UXGA Connectors	Connect to the video sources (from 1 to 8)	
19	*OUT* RJ-45 Connectors	Connect to TP receivers (from 1 to 8), for example, TP-122	
20	*AUDIO INPUT* 3.5mm Mini Jacks	Connect to the unbalanced stereo audio sources (from 1 to 8)	
21	*FACTORY RESET* Button	Press and hold while powering up the unit to reset the audio, switching, EDID and Ethernet settings to their factory default values (see Table 4)	
		IP Address:	192.168.1.39
		Mask:	255.255.255.0
		Gateway:	192.168.1.1
22	*REMOTE IR* Socket[1]	Connect to an external IR receiver unit for controlling the machine via an IR remote controller instead of using the front panel IR receiver[2]	
23	Power Connector Socket	Connect to the AC mains power	
24	Power Connector Fuse	AC mains power fuse	
25	Power Switch	Turns the AC mains power ON/OFF	
26	*PROG* Button	Push in for "Program" to upgrade to the latest Kramer firmware via RS-232 (see Section 8), or release for "Normal" operation (the factory default)	
27	*RS-232* Terminal Block	Connect to a PC or remote controller (see Section 8)	
28	*RS-485* Terminal Block	Connect to another RS-485-equiped device for control (see Section 6.2)	
29	*RS-485 TERM* DIP-switch	RS-485 bus termination[3]: ON to terminate with 120Ω, OFF for no termination (see Section 6.2.1)	
30	*ETHERNET* Connector	Connect to a PC or other serial controller through the computer network for control (see Section 8)	

1 Covered by a cap. The 3.5mm mini connector at the end of the internal IR connection cable fits through this opening

2 Optional. Can be used instead of the front panel (built-in) IR receiver to remotely control the machine (only if the internal IR connection cable has been installed)

3 The first and the last units on the RS-485 line should be terminated (ON). Other units should be unterminated (OFF)

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5 Installing the VP-8x8TP in a Rack

This section describes what to do before installing in a rack and how to rack mount the **VP-8x8TP**.

Before installing in a rack, be sure that the environment is within the recommended range:

OPERATING TEMPERATURE:	0º to +55ºC (32º to 131ºF)
STORAGE TEMPERATURE:	-45º to +72ºC (-49º to 162ºF)
HUMIDITY:	10% to 90%, RHL non-condensing

CAUTION!

When installing on a 19" rack, avoid hazards by taking care that:

1. It is located within the recommended environmental conditions, as the operating ambient temperature of a closed or multi unit rack assembly may exceed the room ambient temperature.

2. Once rack mounted, enough air will still flow around the machine.

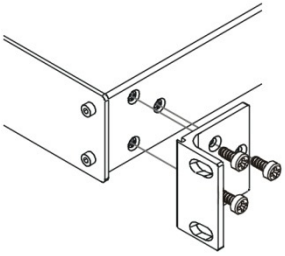
3. The machine is placed straight in the correct horizontal position.

4. You do not overload the circuit(s). When connecting the machine to the supply circuit, overloading the circuits might have a detrimental effect on overcurrent protection and supply wiring. Refer to the appropriate nameplate ratings for information. For example, for fuse replacement, see the value printed on the product label.

5. The machine is earthed (grounded) in a reliable way and is connected only to an electricity socket with grounding. Pay particular attention to situations where electricity is supplied indirectly (when the power cord is not plugged directly into the socket in the wall), for example, when using an extension cable or a power strip, and that you use only the power cord that is supplied with the machine.

To rack-mount a machine:

1. Attach both ear brackets to the machine. To do so, remove the screws from each side of the machine (3 on each side), and replace those screws through the ear brackets.



2. Place the ears of the machine against the rack rails, and insert the proper screws (not provided) through each of the four holes in the rack ears.

Note:

- In some models, the front panel may feature built-in rack ears
- Detachable rack ears can be removed for desktop use
- Always mount the machine in the rack before you attach any cables or connect the machine to the power
- If you are using a Kramer rack adapter kit (for a machine that is not 19"), see the Rack Adapters user manual for installation instructions available from our Web site

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6 Connecting and Configuring the VP-8x8TP 8x8 UXGA/Audio Matrix Switcher

This section includes:

- Connecting the **VP-8x8TP** *8x8 UXGA/Audio Matrix Switcher* (see Section 6.1)
- Connecting to the **VP-8x8TP** *8x8 UXGA/Audio Matrix Switcher* via RS-485 (see Section 6.2)
- Configuring the Ethernet Port (see Section 6.4)
- Operating the **VP-8x8TP** *8x8 UXGA/Audio Matrix Switcher* (see Section 6.5)
- Setting the Switching Delay Time (see Section 6.6)

6.1 Connecting the VP-8x8TP 8x8 UXGA/Audio Matrix Switcher

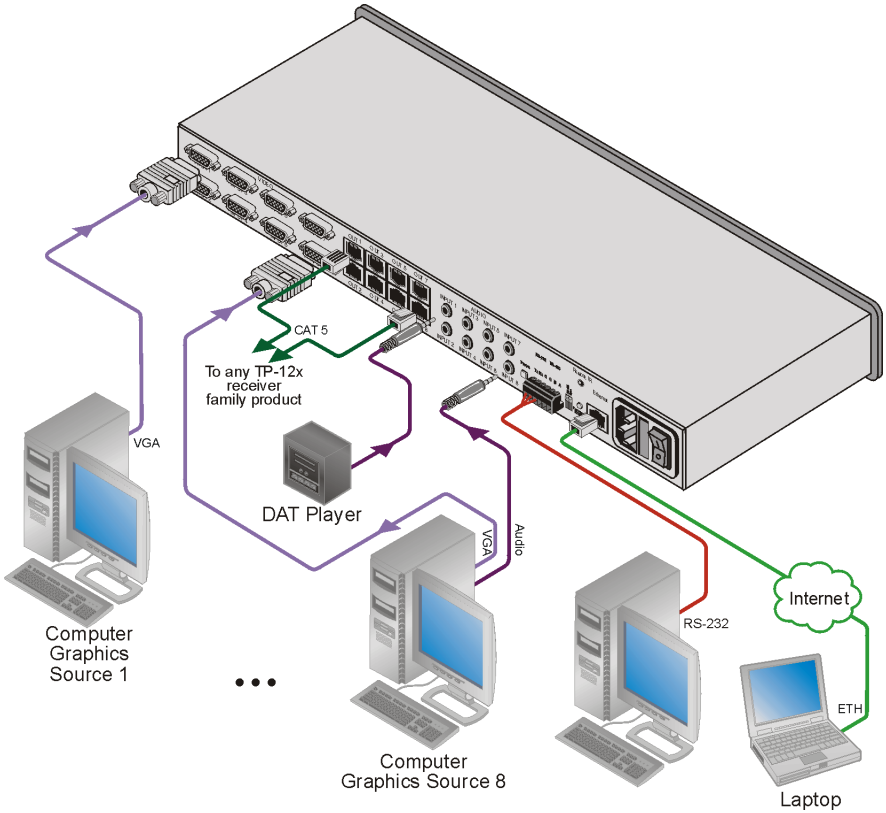

Figure 3: Connecting the VP-8x8TP 8x8 UXGA/Audio Matrix Switcher

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To connect[1] the VP-8x8TP, as illustrated in the example2 in Figure 3:

1. Connect up to eight UXGA computer video graphics sources to the INPUT 15-pin HD connectors.
2. Connect up to eight unbalanced stereo audio sources (for example, audio sources of the computer and stereo audio sources) to the eight INPUT 3.5mm mini jacks.
3. Connect the eight OUTPUT RJ-45 connectors via STP cable to up to eight compatible TP receivers (for example, **TP-122**) via STP cable (with a range of more than 100m (330ft)).
4. Optional—Connect a PC and/or controller to the:
   - RS-232 port
   - RS-485 port (see Section 6.2)
   - Ethernet (see Section 6.2.1)
5. Connect the power cord[3] (not shown in Figure 3).

6.2 Connecting to the VP-8x8TP 8x8 UXGA/Audio Matrix Switcher via RS-485

You can operate the **VP-8x8TP** via the RS-485 port from a distance of up to 1200 meters (3900ft) using any device equipped with an RS-485 port (for example, a PC). For successful communication, you must set the RS-485 machine number and bus termination correctly.

To connect a device with a RS-485 port to the VP-8x8TP:

1. Connect the **VP-8x8TP** to the device as follows:
   - Connect the TxD+ pin on the RS-485 port of the PC to the A (+) pin on the RS-485 port on the rear panel of the **VP-8x8TP**
   - Connect the TxD- pin on the RS-485 port of the PC to the B (-) pin on the RS-485 port on the rear panel of the **VP-8x8TP**
   - If shielded twisted pair cable is used, the shield may be connected to the G (ground) pin on the unit
2. Set the **VP-8x8TP** unit to a Machine number between 2 and 16 (see Section 6.2.2).
3. Set the RS-485 TERM DIP-switch On (see Section 6.2.1) if it is the only machine being controlled via the RS-485 bus.

1 You do not need to connect all inputs and outputs

2 Switch OFF the power on each device before connecting it to your VP-8x8TP. After connecting your VP-8x8TP, switch on its power and then switch on the power on each device. DO NOT push in the rear panel Flash Program “PROG” button, it is used only for upgrading to the latest Kramer firmware

3 We recommend that you use only the power cord that is supplied with this machine

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6.2.1 Setting the RS-485 Bus Termination

Set the RS-485 TERM DIP-switch (see Figure 4) ON (for RS-485 Line Termination with 120Ω) if there is only one **VP-8x8TP** on the RS-485 bus. If there are multiple **VP-8x8TP** units on the RS-485 bus, only the first and last units on the RS-485 bus termination should be set to ON.

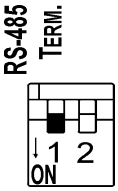

Figure 4: The RS-485 TERM Dipswitch

6.2.2 Setting the RS-485 Bus Machine Number

The Machine number determines the position of a **VP-8x8TP** on the RS-485 bus when connecting multiple units. Each **VP-8x8TP** must be set to a unique number.

To set the Machine number:

1. Press the STO and RCL buttons simultaneously.
   The 7-segment display shows the current machine number.
2. Use the + and – buttons to set the Machine number as required.
3. Press the TAKE button to exit the Machine number mode.

6.3 Connecting to VP-8x8TP via the RS-232 Port

You can connect to the **VP-8x8TP** via an RS-232 connection using, for example, a PC.

To connect to the VP-8x8TP via RS-232:

- Connect the RS-232 9-pin D-sub port on the PC to the 3-pin terminal block on the **VP-8x8TP** (pin 2 to TX, pin 3 to RX, pin 5 to GND)

6.4 Configuring the Ethernet Port

To configure the Ethernet port, connect your PC to the **VP-8x8TP** via either the Ethernet port (see Section 6.4.1) or via a serial port. Once the machine is connected via either of these methods, you can configure the Ethernet port.

6.4.1 Connecting via the Ethernet Port

You can connect to the **VP-8x8TP** via the Ethernet port in either of the following ways:

- Direct connection to the PC using a crossover cable (see Section 6.4.1.1)
- Connection via a network hub, switch, or router using a straight-through cable (see Section 6.4.1.2)

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6.4.1.1 Connecting the Ethernet Port Directly to a PC

You can connect the Ethernet port of the machine to the Ethernet port on your PC, via a crossover cable with RJ-45 connectors.

This type of connection is recommended for identification of the factory default IP Address[1] of the **VP-8x8TP** during the initial configuration

After connecting the Ethernet port, configure your PC as follows:

1. Click **Start** > **Control Panel.**
2. Double-click **Network Connections.**
3. Right-click, and from the menu select **Properties**.
   The **Local Area Connection Properties** window appears.
4. Select **Internet Protocol (TCP/IP)** (see Figure 5).

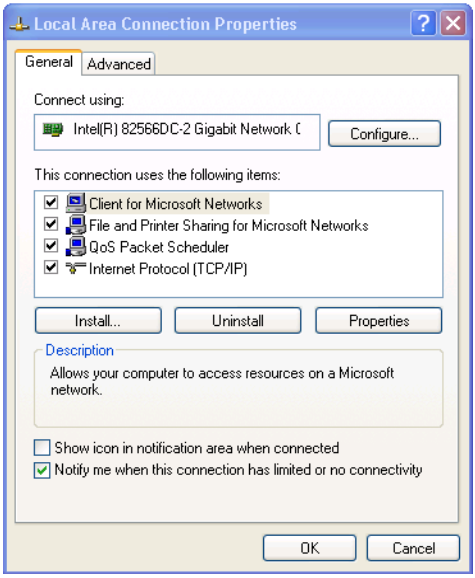

Figure 5: Local Area Connection Properties Window

5. Click the **Properties** button.
6. Select **Use the following IP address**, and fill in the details as shown in Figure 6. You can use any IP address in the range 192.168.1.1 to 192.168.1.255 (excluding 192.168.1.39) that is provided by your IT department.

1 The default IP address is 192.168.1.39

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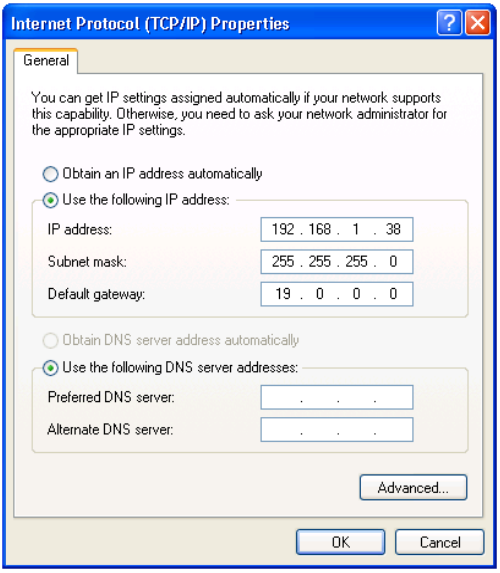
Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address: 192 . 168 . 1 . 38
Subnet mask: 255 . 255 . 255 . 0
Default gateway: 19 . 0 . 0 . 0
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

Figure 6: Internet Protocol (TCP/IP) Properties Window

7. Click **OK**.

6.4.1.2 Connecting the ETHERNET Port via a Network Hub, Switch, or Router

You can connect to the Ethernet port of the **VP-8x8TP** to the Ethernet port on a network hub, switch, or router, via a straight-through cable with RJ-45 connectors. Once connected, follow the steps in Section 6.4.1.1.

6.4.2 Ethernet Port Configuration

To configure the Ethernet port on the **VP-8x8TP**, download the **P3K Wizard** software[1] to your PC, extract the files to a folder, and install the software.

To configure the VP-8x8TP Ethernet port:

1. Click **Start** > **All Programs** > **Kramer** > **P3K Wizard**
   The **P3K Wizard** window appears.
2. Click **Connect**.
   The **Connect** window appears.

1 Available from http://www.kramerelectronics.com

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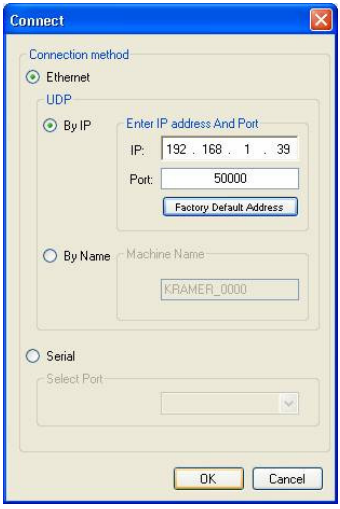

Figure 7: Connect Window

3. Select one of the following methods to connect to the Ethernet port of the **VP-8x8TP**:
   - Ethernet, if you are connected via an Ethernet cable. Enter the IP address[1] or the machine name
     The default IP address is 192.168.1.39 and the default name for the unit is KRAMER_XXXX[2]
   - Serial, if you are connected via a serial port. Select the COM port from the **Select Port** drop-down list
4. Click **OK**.
   The **Device Properties** window appears.

1 The default IP address is 192.168.1.39

2 The four digits are the last four digits of the machine's serial number

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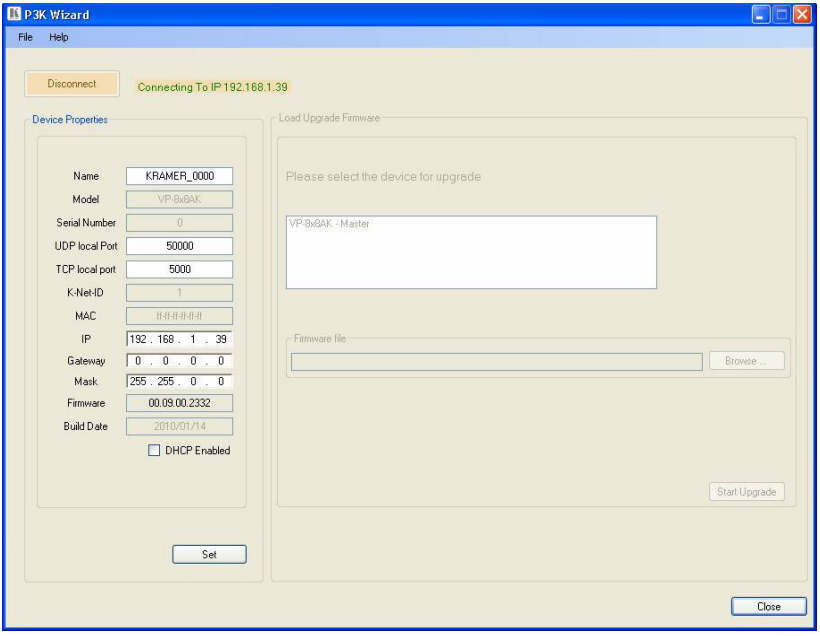

Figure 8: Device Properties Window

5. Make the required changes.
6. Click **Set** to save changes, or click **Close** to exit without saving the changes.

6.5 Operating the VP-8x8TP 8x8 UXGA/Audio Matrix Switcher Remotely

You can operate the **VP-8x8TP** remotely via RS-232, RS-485, and/or Ethernet using the Kramer K-Router application.

If you are operating a standalone unit via RS-232 or the Ethernet, configure the unit as Machine number 1 (see Section 6.2.2).

6.6 Setting the Switching Delay Time

You can achieve clean transitions when switching between non-genlocked sources by setting the delay time—ranging from 0sec to 3.5sec[1]. The factory default delay is 0 seconds.

To set the delay time:

1. Press the VIDEO and AUDIO front panel buttons simultaneously.
   The 7-segment display shows the current switching delay time.
2. Use the + and – front panel buttons to set the delay time as required.
3. To exit the Delay mode, press the TAKE front panel button.

1 In increments of 0.5sec

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7 Operating the VP-8x8TP 8x8 UXGA/Audio Matrix Switcher

This section includes:

- Switching Inputs and Output (see Section 7.1)
- The 7-segment Display Modes (see Section 7.2)
- Confirming Settings (see Section 7.3)
- Storing/Recalling Input-Output Configurations (see Section 7.4)
- Locking the Front Panel (see Section 7.5)
- Choosing the Audio-Follow-Video or Breakaway Option (see Section 7.6)
- Setting the Audio Input Gain (see Section 7.7)
- Using the IR Transmitter (see Section 7.8)

7.1 Switching Inputs and Outputs

7.1.1 Switching an Input to an Output

To switch an input to an output:

1. Press the required OUTPUT button.
   The input number below the selected output on the INPUT 7-segment display flashes.
2. Press an INPUT button to select the input to switch to the output.
   The selected input number appears on the 7-segment display.

Incomplete operations on the **VP-8x8TP** timeout after 15 seconds

7.1.2 Switching an Input to all Outputs

To switch an input to all outputs:

1. Press the ALL button.
   The 7-segment display flashes.
2. Press an INPUT button to select the input to switch to all outputs.
   The selected input is switched to all outputs and the selected input appears on all outputs of the 7-segment display.

7.1.3 Disconnecting an Input from an Output

To disconnect an input from an output:

1. Press the required OUTPUT button.
   The selected output flashes on the 7-segment display.
2. Press the OFF button.
   The selected output is disconnected and displays 0 on the 7-segment display.

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7.1.4 Disconnecting all Inputs from Outputs

To disconnect all inputs from outputs:

1. Press the ALL button.
   The 7-segment display flashes.
2. Press the OFF button.
   All inputs are disconnected from the outputs and display 0 on the 7-segment display.

7.2 The 7-Segment Status Display Modes

This section includes:

- Status Display Immediately After Power is Turned On (see Section 7.2.1)
- Status Display During Normal Operation (see Section 7.2.2)
- Status Display During Audio Level Setting (see Section 7.2.3)

7.2.1 Status Display Immediately After Power is Turned On

Immediately after the unit is turned on, the status display shows the firmware build and machine number (see Figure 9).

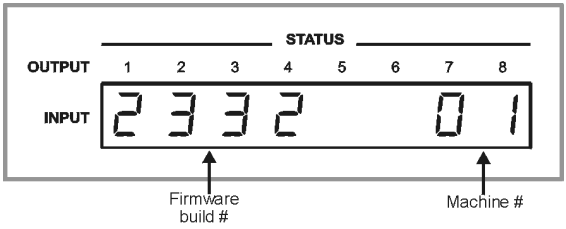

Figure 9: Status Display Five Seconds After Turn On

7.2.2 Status Display During Normal Operation

During normal operation, the STATUS display shows which inputs are switched to which outputs (an example is shown in Figure 10).

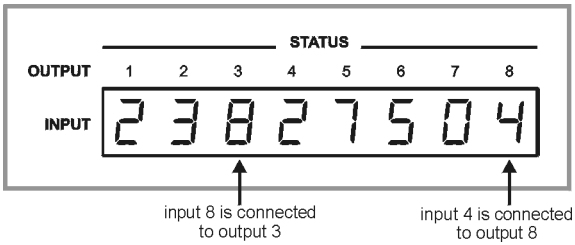

Figure 10: Status Display During Normal Operation

In the VIDEO mode, the display shows the video signal configuration. In the AUDIO mode, the display shows the audio signal configuration. In the AFV mode

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(see Section 7.6.1), the display is for both signal configurations[1].

7.2.3 Status Display During Audio Level Setting

During audio gain level setting, the Status display indicates:

- Which channel number is selected (in this example, 3)
- The current gain setting in 0.5dB increments. The 0.5dB is indicated by the period following the 4 (in this example, **-04.** means **-4.5**).

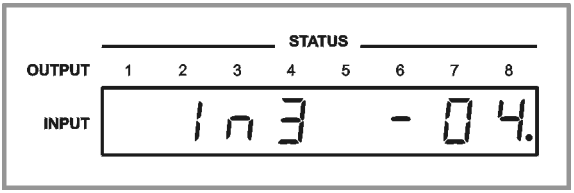

Figure 11: Status Display Showing INPUT 3, Gain -4.5

To set the audio gain, see Section 7.7.

7.3 Confirming Settings

You can choose to work in the At Once or the Confirm mode.

In the At Once mode (TAKE button does not light):

- Pressing an OUT-IN combination implements the switch immediately
- You save time as execution is immediate and actions require no user confirmation
- No protection is offered to allow the correction of an erroneous action before it is implemented

In the Confirm mode (TAKE button lights):

- You can key-in several actions and then confirm them by pressing the TAKE button, to simultaneously activate the multiple switches
- Every action requires user confirmation, protecting against erroneous switching
- Execution is implemented only after the user confirms the action[2]

7.3.1 Toggling between the At Once and Confirm Modes

To toggle between the At Once and Confirm modes:

1. Press the TAKE button to toggle from the At Once mode (in which case the TAKE button does not light) to the Confirm mode (in which case the TAKE button lights).
   Actions now require user confirmation and the TAKE button lights.

1 In AFV mode, the audio and video configurations are the same

2 The action times-out if you do not press the TAKE button within 40 seconds

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2. Press the lit TAKE button to toggle from the Confirm mode back to the At Once mode.
   Actions no longer require user confirmation and the TAKE button no longer lights.

7.3.2 Confirming a Switching Action

To confirm a switching configuration change (in the Confirm mode):

1. Press an OUTPUT-INPUT combination.
   The corresponding 7-segment display flashes with the new value. The TAKE button also flashes.
2. Press the flashing TAKE button to confirm the action.
   The corresponding 7-segment display no longer flashes. The TAKE button flashes.

To confirm several actions (in the Confirm mode):

1. Press each OUTPUT-INPUT combination in sequence.
   The corresponding 7-segment display flashes. The TAKE button also flashes.
2. Press the flashing TAKE button to confirm all the actions.
   The corresponding 7-segment display no longer flashes. The TAKE button lights.

7.4 Storing/Recalling Input-Output Configurations

You can store and recall up to 16 input-output configuration setups[1] using the eight OUTPUT buttons and the eight INPUT buttons on the front panel (see Figure 12).

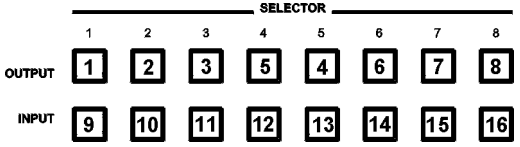

Figure 12: Storing and Recalling using the Input-Output Buttons

7.4.1 Storing an Input-Output Configuration

To store the current status in memory:

1. Press the STO button.
   The STO button flashes.
2. Press one of the 16 INPUT/OUTPUT buttons (this will be the setup # in which the current status is stored).
3. If in the Confirm mode, press the flashing TAKE button to confirm the action.
   The memory stores the data at that reference.

1 You can store and recall audio and video configurations and audio gain data

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7.4.2 Recalling an Input-Output Configuration

To recall an input-output configuration:

1. Press the RCL button.
   The RCL button blinks.
2. Press the appropriate INPUT/OUTPUT button (the button # corresponding to the setup #). If in the Confirm mode, that setup configuration flashes in the Status display together with the RCL button and the TAKE button, and is only be implemented after pressing the TAKE button.
   The memory recalls the stored data from that reference.

Tip: If you cannot remember which of the 16-input-output configurations is the one that you want, set the **VP-8x8TP** to the Confirm mode and manually scan[1] all the input/output configurations until you locate it.

7.5 Locking the Front Panel

To prevent changing the settings accidentally or tampering with the unit via the front panel buttons, lock[2] your **VP-8x8TP**. Unlocking releases the protection mechanism.

To lock the VP-8x8TP:

- Press and hold the LOCK button for more than two seconds until the LOCK button is lit.
  The front panel is locked. Pressing a button has no effect other than to cause the LOCK button to flash[3]

To unlock the VP-8x8TP:

- Press and hold the lit LOCK button for more than two seconds, until the LOCK button is no longer lit
  The front panel is unlocked

7.6 Choosing the Audio-Follow-Video or Breakaway Option

You can switch stereo audio signals in one of two ways, either:

- Audio-follow-video (AFV), in which all operations relate to both the video and the audio channels
- Breakaway, in which video and audio channels switch independently

1 By pressing the RCL button followed by the INPUT/OUTPUT buttons

2 Even when the front panel is locked you can still operate via RS-232 or RS-485, as well as via the Kramer RC-IR3 infrared remote control transmitter

3 Warning that you need to unlock to regain control via the front panel

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7.6.1 Setting the Audio-Follow-Video Option

To set the Audio-follow-video (AFV) option, press the AFV button. One of the following occurs:

- If the AUDIO and VIDEO configurations are the same, then the AFV button lights. The audio follows the video
- If the AUDIO differs from the VIDEO, then the TAKE and the AUDIO buttons flash. Also, the audio outputs of the STATUS display which change, flash[1]. Press the TAKE button to confirm the modification. The audio follows the video

7.6.2 Setting the Breakaway Option

To set the Breakaway option:

- Press either the AUDIO (for audio control only) or the VIDEO (for video control only) button. One of the following occurs:
  - If the AUDIO button lights, switching operations relate to Audio
  - If the VIDEO button lights, switching operations relate to Video

The STATUS window displays audio or video settings according to your selection.

7.7 Setting the Audio Input Gain

The factory default audio input gain is set to 0dB. An audio gain value of 0dB indicates that the output signal value is identical to the input signal value. When increasing/decreasing the audio gain, the output signal level is higher/lower than the input signal level.

The audio gain for each input can be set independently[2].

To set the audio gain of an input:

1. Press the AUDIO LEVEL button.
2. Press the required INPUT SELECTOR button.
   The selected input button flashes. The display indicates which INPUT is selected and the current level setting for the input (see Figure 13).

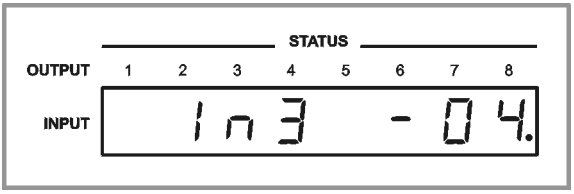

Figure 13: Status Display Showing Audio Gain for Input 3, Gain -4.5

1 This warns that you are about to modify the audio configuration for AFV operation

2 The input level ranges from -99 to +20

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3. Press either the (+) button or the minus (–) button to increase or decrease respectively the audio gain setting.
   The display changes accordingly.
4. Press the AUDIO LEVEL button to exit the gain level setting mode. If no button is pressed for 40 seconds, the **VP-8x8TP** automatically exits the gain level setting mode and the display reverts to normal operation.

7.8 Using the IR Transmitter

You can use the **RC-IR3** IR transmitter to control the machine via the built-in IR receiver on the front panel or, instead, via an optional external IR receiver1. The external IR receiver can be located up to 15m (49ft) away from the machine. This distance can be extended to up to 60m (196ft) when used with three extension cables[2]

Before using the external IR receiver, be sure to arrange for your Kramer dealer to insert the internal IR connection cable[3] with the 3.5mm mini connector that fits into the REMOTE IR opening on the rear panel. Connect the external IR receiver to the REMOTE IR 3.5mm mini connector.

8 Operating Multiple VP-8x8TP Units Remotely via RS-232

You can operate up to 16 **VP-8x8TP** units remotely via the RS-485 bus with control from a PC or serial controller equipped with an RS-232 interface[4].

To operate up to 16 VP-8x8TP units remotely via RS-485 (see Figure 14):

1. Connect the sources and acceptors to the **VP-8x8TP** (see Section 6.1).
2. Connect the RS-232 port of the first **VP-8x8TP** unit to the PC or serial controller.
3. Connect the RS-485 port on the first **VP-8x8TP** to the RS-485 port on the second **VP-8x8TP** unit, and so on (see Section 6.2), connecting all the RS-485 ports.
4. Set the Machine number of the first **VP-8x8TP** to Machine number 1 (see Section 6.2.2).
5. Set the other **VP-8x8TP** units to be Machine numbers between 2 and 16.
6. On the first and last **VP-8x8TP** units, set the RS-485 TERM Dipswitch ON (terminating the RS-485 line at 120Ω) (see Section 6.2).
7. On all other **VP-8x8TP** units, set the RS-485 TERM Dipswitch OFF.

1 Model: C-A35M/IRR-50

2 Model: C-A35M/A35F-50

3 P/N: 505-70434010-S

4 Alternatively, the Ethernet port can be used for PC control (instead of RS-232)

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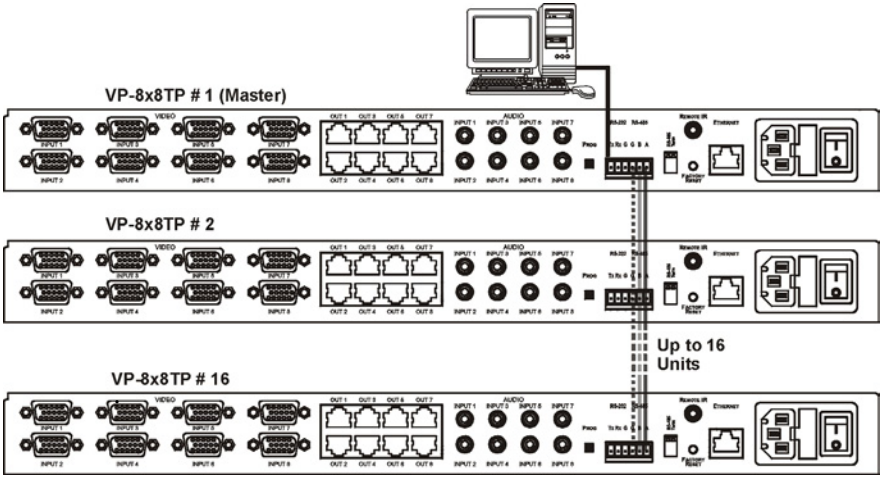

Figure 14: Control Configuration via RS-232 and RS-485

9 Operating the VP-8x8TP Remotely via your Web Browser

You can remotely operate the **VP-8x8TP** using a Web browser via the Ethernet connection (see Section 9.1). To be able to do so, you must use a supported Web browser; Microsoft (V6.0 and higher), Chrome, Firefox (V3.0 and higher).

To check that Java is installed and running, browse to:
http://www.java.com/en/download/help/testvm.xml

This page runs a test and displays a Java success (see Figure 15) or failure message.

Figure 15: Java Test Page Success Message

If you do not see the success message, follow the instructions on the page to:

- Load and enable Java
- Enable Javascript in your browser

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9.1 Connecting to the VP-8x8TP via your Browser

Make sure that your PC is connected via a network to the **VP-8x8TP** and do the following:

1. Open your Internet browser.
2. Enter the unit's IP number (for the default IP address, see Table 2) or name in the Address bar of your browser.
   If you are using DHCP, you have to enter the name.

Figure 16: Entering the IP Number in the Address Bar

The Loading page appears.

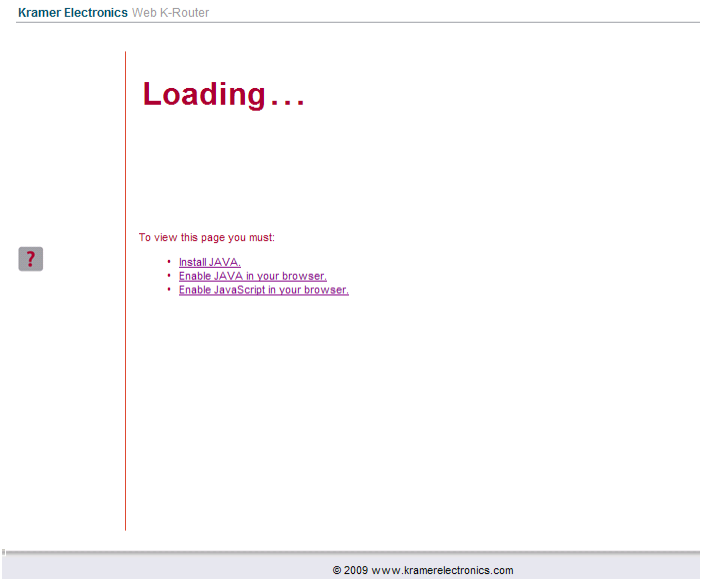

Figure 17: The Loading Page

The first time that you run the Kramer applet a security warning appears.

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Warning - Security
The application's digital signature cannot be verified.
Do you want to run the application?
Name: K_Applet
Publisher: Kramer Electronics
From: http://192.168.1.39
Always trust content from this publisher.
Run
Cancel
The digital signature cannot be verified by a trusted source. Only run if you trust the origin of the application.
More Information...

Figure 18: First Time Security Warning

3. Click **Run**.
   The main switching control page is displayed which shows a graphical representation of the front panel (see Figure 19).

There are three remote operation Web pages:

- Main switching matrix (see Section 9.2)
- Audio gain control (see Section 9.3)
- Configuration (see Section 9.4)

Select a page by clicking on the relevant link on the left hand side of the window.

9.2 The Main Switching Matrix Page

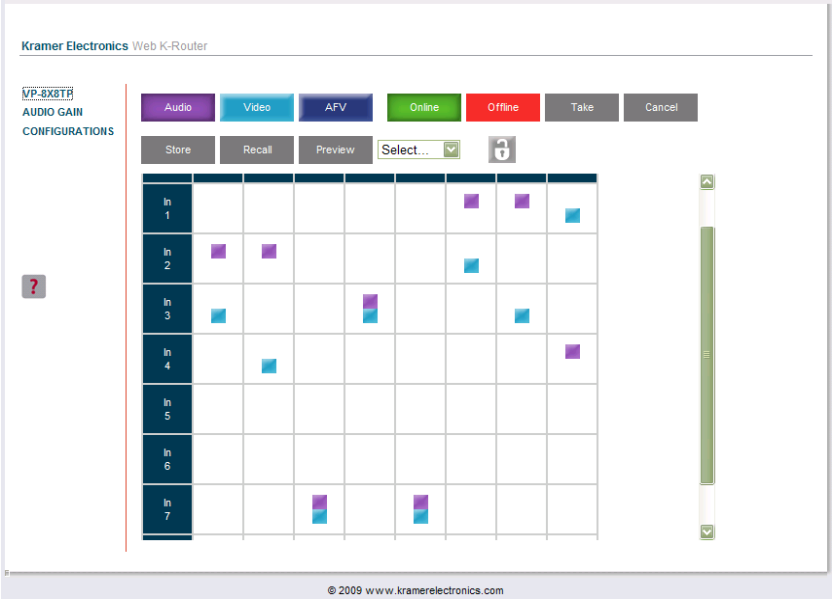

Figure 19: Main Switching Matrix Page

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The main switching matrix page allows you to:

- Switch any audio/video input to any/all outputs independently (see Section 9.2.1)
- Set the audio to operate in AFV (Audio Follow Video) mode (see Section 9.2.2)
- Operate the unit in the Offline mode (see Section 9.2.3)
- Use presets to store and recall switching configurations (see Section 9.2.4)
- Lock or unlock the unit's front panel buttons (see Section 9.2.5)

9.2.1 Switching an Input to an Output

To switch an input to an output, for example, video input 1 to video output 4:

1. Click the blue **Video** button.
   The button outline becomes dark. Actions now relate to video channels.
2. Click the required point within the switching matrix grid (In 1, Out 4).

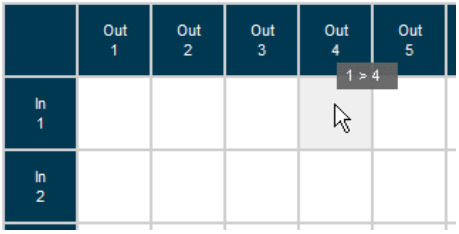

Figure 20: Selecting a Switching Point on the Matrix

A blue video icon appears indicating that the video channel is switched to In 1 and Out 4.

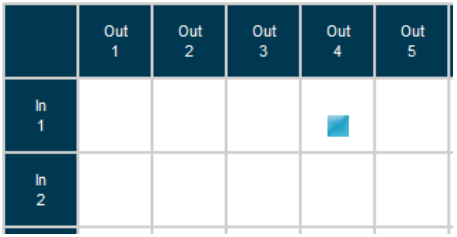

Figure 21: Switching an Input to an Output

3. Repeat the above steps for each video and audio (clicking the purple **Audio** button) channel that you want to switch.

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9.2.2 Setting the AFV Mode

Audio channel In 1 is currently switched to Out 4.

To set the AFV mode:

1. Click the **AFV** button.
   The following warning appears.

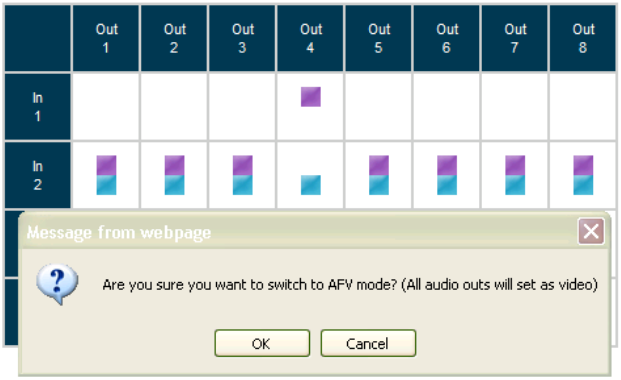

Figure 22: AFV Mode Warning

2. Click **OK**.
   The **AFV** button outline becomes dark.
   All audio channels are switched according to the corresponding video channels. In this example, audio channel In 2 is now switched to Out 4.

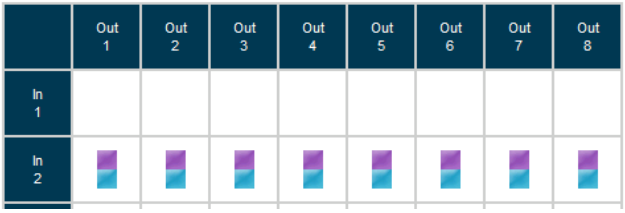

Figure 23: AFV Mode Audio Channels Switched

All configuration changes now switch audio and video simultaneously.

9.2.3 Operating in the Offline Mode

By default, the unit operates in the At-Once mode, meaning that any switching changes take effect immediately. In the Offline mode, changes only take effect when you press the **Take** button.

To operate in the Offline mode:

1. Click the red **Offline** button.
   The button outline becomes dark.

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2. Click the required point in the switching matrix grid (In 1, Out 5).

   The audio/video indicator icon outline ☐ (in this example, audio) appears, and the **Take** and **Cancel** buttons change from gray to dark blue.

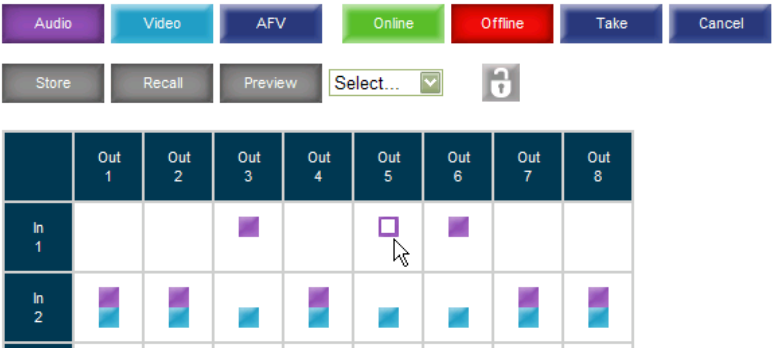

Figure 24: Switching Audio in the Offline Mode

3. If required, repeat Step 2 for several audio/video channels.
4. Click either **Take** to accept the change or **Cancel**.
5. Click the **Online** button to exit the Offline mode.
   If you have made any changes since clicking the **Take** button, the exiting Offline warning appears.

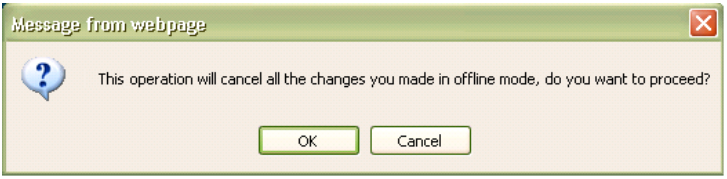
Message from webpage
This operation will cancel all the changes you made in offline mode, do you want to proceed?
OK
Cancel

Figure 25: Exiting Offline Warning

9.2.4 Storing and Recalling Setups

You can store switching configurations in presets and recall them at any time.

To store a switching configuration:

1. From the Preset drop-down list, select a preset (in this example, Preset 07).
   Presets that contain a configuration are displayed with a blue background; presets with no configuration have a white background.
   When you select a preset, the **Store** button changes from gray to dark blue.

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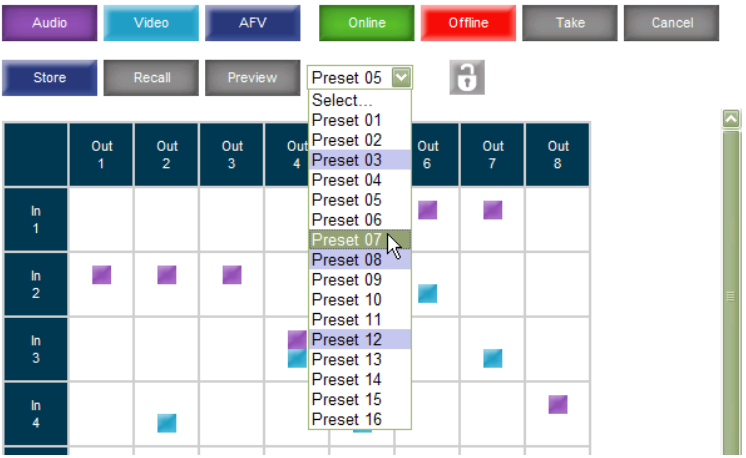

Figure 26: Selecting Preset 07

2. Click **Store**.
   A confirmation message appears.
3. Click **OK**.
   The configuration is stored in Preset 07.

To recall a setup:

1. From the Preset drop-down list, select a preset (in this example, Preset 03).
   Presets that contain a configuration are displayed with a blue background; presets with no configuration have a white background.
   When you select a preset that contains a configuration, the **Recall** button changes from gray to dark blue.

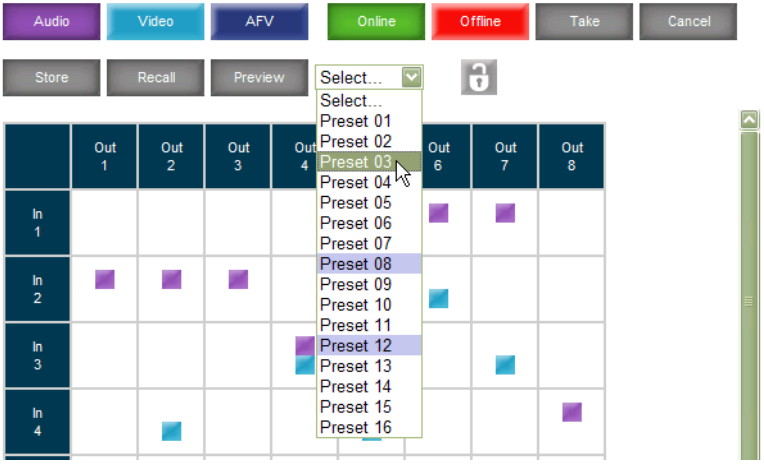

Figure 27: Selecting Preset 03

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2. Click **Recall**.
   A confirmation message appears.
3. Click **OK**.
   The configuration from Preset 03 is loaded.

Note: You can also recall a preset in the Offline mode (see Figure 29) and make it active when you press the **Take** button (see Section 9.2.3).

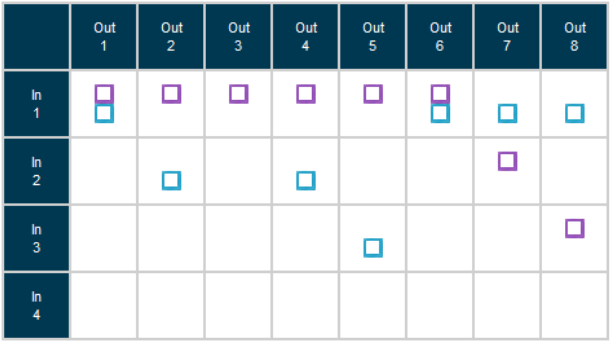

Figure 28: Recalling a Preset in Offline Mode

9.2.5 Locking the Front Panel Buttons

You can lock the front panel buttons to prevent tampering.

To lock the front panel buttons:

- Click the padlock icon

Note: Locking the front panel buttons does not disable remote operation of the unit via Ethernet, RS-232 or RS-485.

9.3 Audio Input Gain Control Page

The Audio Gain page lets you set the gain for each of the input channels independently.

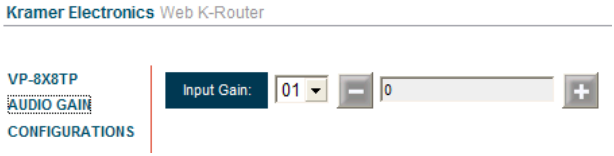

Figure 29: Audio Gain Control Page

To change the audio gain (in this example, input gain for channel 2):

1. From the Input Gain drop-down list, click 02.

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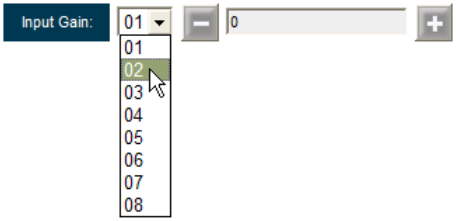

Figure 30: Selecting Audio Input Gain for Channel 2

2. Click the – or + button to decrease or increase the gain. Hold the – or + button down to cycle through the values.

Note: Each click increments/decrements the value by 0.5. To change the gain by a whole number, you must click the +/– button twice.

9.4 The Configuration Page

The Configuration page lets you edit the IP-related settings and only view the others. Editable fields have a white background.

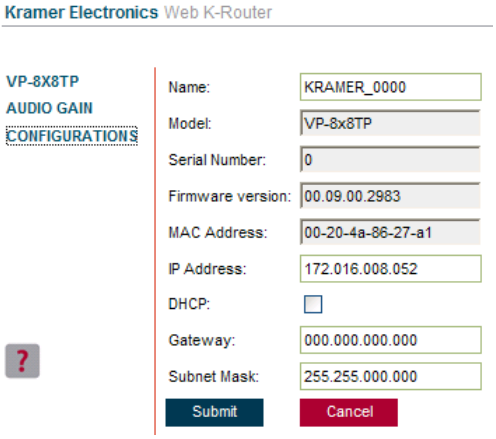

Figure 31: Configuration Page

The following IP-related settings can be edited:

- Machine name
- Fixed IP Address/DHCP
- Gateway
- Subnet Mask

The following fields can be viewed:

- Model
- Serial Number

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- Firmware Version
- MAC Address

To edit the IP-related settings:

1. Edit the required field.
2. Click **Submit**.
   The Network Settings confirmation message appears.
3. Click **OK**.
   A message appears showing that the settings have been successfully changed.
4. If the IP address was changed or you selected DHCP, reload the Web page using the new name or IP address.

10 EDID

Each input on the **VP-8x8TP** has a factory default EDID loaded (see Section 14). The EDID for each input can be changed independently by uploading an EDID binary file to each input via the RS-232 port using Kramer EDID Designer software[1].

11 Firmware Upgrade

For instructions on upgrading the firmware, see the *Updating the Firmware Using the P3K Software* document.

The latest version of firmware and installation instructions can be downloaded from the Kramer Web site at www.kramerelectronics.com.

1 Available for download from http://www.kramerelectronics.com

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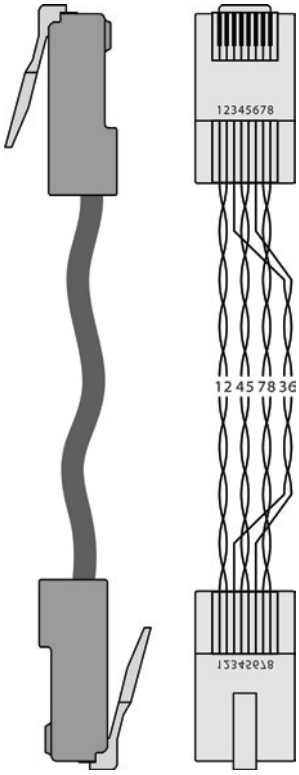
11.1 Wiring the TP RJ-45 Connectors

This section defines the TP pinout, using a **straight** pin-to-pin cable with RJ-45 connectors.

Note, that the cable Ground shielding must be connected / soldered to the connector shield.

EIA /TIA 568B	
PIN	**Wire Color**
1	Orange / White
2	Orange
3	Green / White
4	Blue
5	Blue / White
6	Green
7	Brown / White
8	Brown

Figure 32: TP Pinout Wiring



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12 Technical Specifications

Technical specifications of the **VP-8x8TP** are shown in Table 3.

Table 3: Technical Specifications[1] of the VP-8x8TP 8x8 UXGA/Audio Matrix Switcher

INPUTS:	8 VGA on 15-pin HD connectors (VGA through UXGA) 8 unbalanced stereo audio on 3.5mm mini jacks	
OUTPUTS:	8 RJ-45 connectors	
MAX. OUTPUT LEVEL:	VIDEO: 1.9Vpp	AUDIO: 3Vpp
RESOLUTION:	Up to UXGA, 1080p	
AUDIO BANDWIDTH:	18kHz (–3dB)	
DIFF. GAIN:	1.8%	
DIFF. PHASE:	0.3Deg	
K-FACTOR:	<0.05%	
S/N RATIO:	VIDEO: 60dB @5MHz	AUDIO: 81dB @1kHz
CROSSTALK (all hostile):	VIDEO: –46dB @5MHz	AUDIO: <–72dB @1kHz
CONTROLS:	Front panel buttons, RS-232, RS-485, Ethernet, Infrared	
COUPLING:	VIDEO: AC	AUDIO: AC
AUDIO THD + NOISE:	0.035% @1kHz	
AUDIO 2nd HARMONIC:	0.002% @1kHz	
TRANSMISSION RANGE:	>100m (330ft)	
OPERATING TEMPERATURE:	0° to +55°C (32° to 131°F)	
STORAGE TEMPERATURE:	–45° to +72°C (–49° to 162°F)	
HUMIDITY:	10% to 90%, RHL non-condensing	
POWER CONSUMPTION:	100-240V AC, 68VA	
DIMENSIONS:	19" x 7.5" x 1U (48.3cm x 19cm x 1U) W, D, H	
WEIGHT:	2.6kg (5.7lbs) approx	
ACCESSORIES:	Power cord, Windows®-based control software, external remote IR receiver cable[2]	

13 Default Communication Parameters

Table 4 lists the default communication parameters as used in the **VP-8x8TP**.

Table 4: Default Communication Parameters

RS-232			
Protocol 2000		**Protocol 3000 (Default)**	
Baud Rate:	9600	Baud Rate:	115,200
Data Bits:	8	Data Bits:	8
Stop Bits:	1	Stop Bits:	1
Parity:	None	Parity:	None
Command Format:	HEX	Command Format:	ASCII
Example (Output 1 to Input 1):	0x01, 0x81, 0x81, 0x81	Example (Output 1 to Input 1):	#AV 1>1<CR>

1 Specifications are subject to change without notice

2 P/N: C-A35M/IRR-50

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Switching Protocol			
P2000 -> P3000		**P3000 -> P2000**	
Command:	0x38, 0x80, 0x83, 0x81	Command:	#P2000<CR>
Front Panel:	Press and hold Output 1 and Output 3 simultaneously	Front Panel:	Press and hold Output 1 and Output 2 simultaneously

Ethernet Factory Default Values	
To reset the IP settings to the factory reset values, power cycle the device while holding in the Factory Reset button, located on the rear panel of the unit	
IP Address:	192.168.1.39
Subnet mask:	255.255.255.0
Default gateway:	192.168.1.1
TCP Port #:	5000
UDP Port #:	50000
Maximum UDP Ports:	10
Maximum TCP Ports:	4

14 Default EDID

The default EDID is stored in all inputs.

Monitor

Model name	VP-8X8TP
Manufacturer	KRM
Plug and Play, ID	KRM0808
Serial number	2
Manufacture date	2009, ISO week 10
EDID revision	1.3
Input signal type	Analog 0.700, 0.000 (0.7 Vp-p)
Sync input support	Separate, Composite, Sync-on-green
Display type	RGB color
Screen size	360 x 290 mm (18.2 in)
Power management	Standby, Suspend, Active off/Sleep
Extension blocs	None
DDC/CI	Not supported

Color characteristics

Default color space	sRGB
Display gamma	2.0
Red chromaticity	Rx 0.611 - Ry 0.329
Green chromaticity	Gx 0.312 - Gy 0.559
Blue chromaticity	Bx 0.148 - By 0.131
White point (default)	Wx 0.320 - Wy 0.336
Additional descriptors	None

Timing characteristics

Range limits	Not available
GTF standard	Not supported
Additional descriptors	None
Preferred timing	Yes
Native/preferred timing	1024x768p at 60Hz (4:3)
Modeline	"1024x768" 65.000 1024 1048 1184 1344 768 771 777 806 -hsync –vsync

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Default EDID

Detailed timing #1	1280x800p at 60Hz (1:1)
Modeline	"1280x800" 71.000 1280 1328 1360 1440 800 803 809 823 +hsync –vsync

Standard timings supported

640 x 480p at 60Hz
640 x 480p at 67Hz
640 x 480p at 72Hz
640 x 480p at 75Hz
800 x 600p at 56Hz
800 x 600p at 60Hz
800 x 600p at 72Hz
800 x 600p at 75Hz
1024 x 768p at 60Hz
1024 x 768p at 70Hz
1024 x 768p at 75Hz
1280 x 1024p at 75Hz
1280 x 1024p at 60Hz
1280 x 960p at 60Hz
1400 x 1050p at 60Hz
1440 x 900p at 60Hz
1600 x 1200p at 60Hz

Report information

Date generated	11/15/2010
Software revision	2.43.0.822
Operating system	5.1.2600.2.Service Pack 3

Raw data

00,FF,FF,FF,FF,FF,FF,00,2E,4D,08,08,02,00,00,00,0A,13,01,03,6E,24,1D,64,EE,9C,20,9C,54,4F,8F,26,
21,52,56,3F,CF,00,81,80,81,40,90,40,95,00,A9,40,D1,00,D1,C0,01,01,64,19,00,40,41,00,26,30,18,88,
36,00,30,E4,10,00,00,18,BC,1B,00,A0,50,20,17,30,30,20,36,00,20,20,00,00,00,1A,00,00,00,FC,00,56,
50,2D,38,58,38,54,50,0A,20,20,20,20,00,00,00,10,00,56,50,2D,38,58,38,54,50,20,0A,20,20,20,00,4A

Table 5 and Table 6 list the ASCII codes that switch an input to an output for a single **VP-8x8TP** machine.

Table 5: VP-8x8TP Video Signal Codes

	OUT 1	OUT 2	OUT 3	OUT 4	OUT 5	OUT 6	OUT 7	OUT 8
IN 1	#V 1>1 CR	#V 1>2 CR	#V 1>3 CR	#V 1>4 CR	#V 1>5 CR	#V 1>6 CR	#V 1>7 CR	#V 1>8 CR
IN 2	#V 2>1 CR	#V 2>2 CR	#V 2>3 CR	#V 2>4 CR	#V 2>5 CR	#V 2>6 CR	#V 2>7 CR	#V 2>8 CR
IN 3	#V 3>1 CR	#V 3>2 CR	#V 3>3 CR	#V 3>4 CR	#V 3>5 CR	#V 3>6 CR	#V 3>7 CR	#V 3>8 CR
IN 4	#V 4>1 CR	#V 4>2 CR	#V 4>3 CR	#V 4>4 CR	#V 4>5 CR	#V 4>6 CR	#V 4>7 CR	#V 4>8 CR
IN 5	#V 5>1 CR	#V 5>2 CR	#V 5>3 CR	#V 5>4 CR	#V 5>5 CR	#V 5>6 CR	#V 5>7 CR	#V 5>8 CR
IN 6	#V 6>1 CR	#V 6>2 CR	#V 6>3 CR	#V 6>4 CR	#V 6>5 CR	#V 6>6 CR	#V 6>7 CR	#V 6>8 CR
IN 7	#V 7>1 CR	#V 7>2 CR	#V 7>3 CR	#V 7>4 CR	#V 7>5 CR	#V 7>6 CR	#V 7>7 CR	#V 7>8 CR
IN 8	#V 8>1 CR	#V 8>2 CR	#V 8>3 CR	#V 8>4 CR	#V 8>5 CR	#V 8>6 CR	#V 8>7 CR	#V 8>8 CR

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Table 6: VP-8x8TP Audio Signal Codes

	OUT 1	OUT 2	OUT 3	OUT 4	OUT 5	OUT 6	OUT 7	OUT 8
IN 1	#A 1>1 CR	#A 1>2 CR	#A 1>3 CR	#A 1>4 CR	#A 1>5 CR	#A 1>6 CR	#A 1>7 CR	#A 1>8 CR
IN 2	#A 2>1 CR	#A 2>2 CR	#A 2>3 CR	#A 2>4 CR	#A 2>5 CR	#A 2>6 CR	#A 2>7 CR	#A 2>8 CR
IN 3	#A 3>1 CR	#A 3>2 CR	#A 3>3 CR	#A 3>4 CR	#A 3>5 CR	#A 3>6 CR	#A 3>7 CR	#A 3>8 CR
IN 4	#A 4>1 CR	#A 4>2 CR	#A 4>3 CR	#A 4>4 CR	#A 4>5 CR	#A 4>6 CR	#A 4>7 CR	#A 4>8 CR
IN 5	#A 5>1 CR	#A 5>2 CR	#A 5>3 CR	#A 5>4 CR	#A 5>5 CR	#A 5>6 CR	#A 5>7 CR	#A 5>8 CR
IN 6	#A 6>1 CR	#A 6>2 CR	#A 6>3 CR	#A 6>4 CR	#A 6>5 CR	#A 6>6 CR	#A 6>7 CR	#A 6>8 CR
IN 7	#A 7>1 CR	#A 7>2 CR	#A 7>3 CR	#A 7>4 CR	#A 7>5 CR	#A 7>6 CR	#A 7>7 CR	#A 7>8 CR
IN 8	#A 8>1 CR	#A 8>2 CR	#A 8>3 CR	#A 8>4 CR	#A 8>5 CR	#A 8>6 CR	#A 8>7 CR	#A 8>8 CR

Table 7 lists the codes that set the audio input gain.

Table 7: VP-8x8TP Audio Input Gain Codes

INPUT 1		INPUT 5		INPUT X*	Level [Rel]
#AUD-LVL 1,1, -100CR	...	#AUD-LVL 1,5, -100CR	...	#AUD-LVL 1,X, -100CR	-100dB Mute
⋮		⋮		⋮	
#AUD-LVL 1,1, -50CR	...	#AUD-LVL 1,5, -50CR	...	#AUD-LVL 1,X, -50CR	-50dB
⋮		⋮		⋮	
#AUD-LVL 1,1, 0CR	...	#AUD-LVL 1,5, 0CR	...	#AUD-LVL 1,X, 0CR	0dB
⋮		⋮		⋮	
#AUD-LVL 1,1, 20CR	...	#AUD-LVL 1,5, 20CR	...	#AUD-LVL 1,X, 20CR	+20dB (Max)

* Where X is the input number from 1 - 8. For example, for channel 7 and relative level -50dB, **#AUD-LVL 1,7, -50CR**

15 Tables of Hex Codes for Serial Communication (Protocol 2000)

The hex codes listed in this section are used to set video channels for a single machine (set as Machine 1) connected via either RS-232 or Ethernet. Similar hex codes are used when the **VP-8x8TP** is connected via RS-485 and the machine is set to number 2.

Table 8 lists the Hex codes for switching video channels.

Table 8: VP-8x8TP Hex Codes for Switching Video Channels

	Switching Video Channels							
	OUT 1	OUT 2	OUT 3	OUT 4	OUT 5	OUT 6	OUT 7	OUT 8
IN 1	01 81 81 81	01 81 82 81	01 81 83 81	01 81 84 81	01 81 85 81	01 81 86 81	01 81 87 81	01 81 88 81
IN 2	01 82 81 81	01 82 82 81	01 82 83 81	01 82 84 81	01 82 85 81	01 82 86 81	01 82 87 81	01 82 88 81
IN 3	01 83 81 81	01 83 82 81	01 83 83 81	01 83 84 81	01 83 85 81	01 83 86 81	01 83 87 81	01 83 88 81
IN 4	01 84 81 81	01 84 82 81	01 84 83 81	01 83 84 81	01 84 85 81	01 84 86 81	01 84 87 81	01 84 88 81
IN 5	01 85 81 81	01 85 82 81	01 85 83 81	01 85 84 81	01 85 85 81	01 85 86 81	01 85 87 81	01 85 88 81
IN 6	01 86 81 81	01 86 82 81	01 86 83 81	01 86 84 81	01 86 85 81	01 86 86 81	01 86 87 81	01 86 88 81
IN 7	01 87 81 81	01 87 82 81	01 87 83 81	01 87 84 81	01 87 85 81	01 87 86 81	01 87 87 81	01 87 88 81
IN 8	01 88 81 81	01 88 82 81	01 88 83 81	01 88 84 81	01 88 85 81	01 88 86 81	01 88 87 81	01 88 88 81

Table 9 lists the Hex codes for switching audio channels.

Table 9: VP-8x8TP Hex Codes for Switching Audio Channels

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	Switching Audio Channels							
	OUT 1	OUT 2	OUT 3	OUT 4	OUT 5	OUT 6	OUT 7	OUT 8
IN 1	02 81 81 81	02 81 82 81	02 81 83 81	02 81 84 81	02 81 85 81	02 81 86 81	02 81 87 81	02 81 88 81
IN 2	02 82 81 81	02 82 82 81	02 82 83 81	02 82 84 81	02 82 85 81	02 82 86 81	02 82 87 81	02 82 88 81
IN 3	02 83 81 81	02 83 82 81	02 83 83 81	02 83 84 81	02 83 85 81	02 83 86 81	02 83 87 81	02 83 88 81
IN 4	02 84 81 81	02 84 82 81	02 84 83 81	02 83 84 81	02 84 85 81	02 84 86 81	02 84 87 81	02 84 88 81
IN 5	02 85 81 81	02 85 82 81	02 85 83 81	02 85 84 81	02 85 85 81	02 85 86 81	02 85 87 81	02 85 88 81
IN 6	02 86 81 81	02 86 82 81	02 86 83 81	02 86 84 81	02 86 85 81	02 86 86 81	02 86 87 81	02 86 88 81
IN 7	02 87 81 81	02 87 82 81	02 87 83 81	02 87 84 81	02 87 85 81	02 87 86 81	02 87 87 81	02 87 88 81
IN 8	02 88 81 81	02 88 82 81	02 88 83 81	02 88 84 81	02 88 85 81	02 88 86 81	02 88 87 81	02 88 88 81

Table 10 lists the Hex codes for increasing or decreasing the audio input gain.

Table 10: VP-8x8TP Hex Codes for Increasing/Decreasing the Audio Input Gain

	IN 1	IN 2	IN 3	IN 4	IN 5	IN 6	IN 7	IN 8
Increase	18 81 86 81	18 82 86 81	18 83 86 81	18 84 86 81	18 85 86 81	18 86 86 81	18 87 86 81	18 88 86 81
Decrease	18 81 87 81	18 82 87 81	18 83 87 81	18 84 87 81	18 85 87 81	18 86 87 81	18 87 87 81	18 88 87 81

Table 11 lists the Hex codes for setting the audio input gain. Before sending the any of the codes in Table 11, the command **2A 86 80 81** must be sent.

Table 11: VP-8x8TP Hex Codes for Setting the Audio Input Gain

IN 1	IN 2	IN 3	IN 4	IN 5	IN 6	IN 7	IN 8	Level [Rel]
16 81 80* 81	16 82 80* 81	16 83 80* 81	16 84 80* 81	16 85 80* 81	16 86 80* 81	16 87 80* 81	16 88 80* 81	Mute
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	
16 81 87* 81	16 82 87* 81	16 83 87* 81	16 84 87* 81	16 85 87* 81	16 86 87* 81	16 87 87* 81	16 88 87* 81	-100dB Mute
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	
16 81 B9* 81	16 82 B9* 81	16 83 B9* 81	16 84 B9* 81	16 85 B9* 81	16 86 B9* 81	16 87 B9* 81	16 88 B9* 81	-50dB
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	
16 81 EB* 81	16 82 EB* 81	16 83 EB* 81	16 84 EB* 81	16 85 EB* 81	16 86 EB* 81	16 87 EB* 81	16 88 EB* 81	0dB
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	
16 81 FF* 81	16 82 FF* 81	16 83 FF* 81	16 84 FF* 81	16 85 FF* 81	16 86 FF* 81	16 87 FF* 81	16 88 FF* 81	+20dB (Max)

* BYTE 3 = 0x80 + Gain Value (0x00-0x7F)

16 Kramer Protocol

You can download our user-friendly *Software for Calculating Hex Codes for Protocol 2000*" from the technical support section on our Web site at http://www.kramerelectronics.com.

Section 16.1 describes how to switch between Protocol 3000 and Protocol 2000. Section 16.2 defines Protocol 3000 and Section 16.3 defines Protocol 2000.

By default, the **VP-8x8TP** is set to Kramer's Protocol 3000, but it is also compatible with Protocol 2000.

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16.1 Switching Protocols

You can switch protocols either via the front panel buttons (see Section 16.1.1) or by sending protocol commands (see Section 16.1.2).

16.1.1 Switching Protocols via the Front Panel Buttons

To switch from Protocol 3000 to Protocol 2000, press and hold[1] the OUT 1 and OUT 2 buttons for a few seconds.

To switch from Protocol 2000 to Protocol 3000, press and hold the OUT 1 and OUT 3 buttons for a few seconds.

16.1.2 Switching Protocols via Protocol Commands

To switch from Protocol 3000 to Protocol 2000, send the following command:

- #P2000<CR>

To switch from Protocol 2000 to Protocol 3000, send the following command:

- 0x38, 0x80, 0x83, 0x81

The Windows®-based Kramer control software[2] operates with Protocol 2000. If the **VP-8x8TP** is set to Protocol 3000, it is automatically switched to Protocol 2000.

16.2 Kramer Protocol 3000

This RS-232/RS-485 communication protocol lets you control the machine from any standard terminal software (for example, Windows® HyperTerminal) with default settings of 115200 baud data rate, no parity, 8 data bits, and 1 stop bit.

16.2.1 Protocol 3000 Syntax

Host message format:

Start	Address (optional)	Body	Delimiter
#	*Destination_id@*	message	CR

Simple command (commands string with only one command without addressing):

start	body	delimiter
#	Command SP Parameter_1,Parameter_2,…	CR

Commands string (formal syntax with commands concatenation and addressing):

 # Address@ **Command_1** *Parameter1_1,Parameter1_2,…* |*Command_2 Parameter2_1,Parameter2_2,…* |*Command_3 Parameter3_1,Parameter3_2,…* |…**CR**

1 Not as part of a switching operation

2 Download the latest software from our Web site at http://www.kramerelectronics.com

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Device message format:

Start	Address (optional)	Body	Delimiter
~	*Sender_id@*	message	CR LF

Device long response (**Echoing command**):

Start	Address (optional)	Body	Delimiter
~	*Sender_id@*	**command** SP **[***param1 ,param2 …***]** result	CR LF

CR = Carriage return (ASCII 13 = 0x0D)

LF = Line feed (ASCII 10 = 0x0A)

SP = Space (ASCII 32 = 0x20)

16.2.2 Command Parts Details

Command:
Sequence of ASCII letters ('A'-'Z', 'a'-'z' and '-').
Command will separate from parameters with at least single space.

Parameters:
Sequence of Alfa-Numeric ASCII chars ('0'-'9','A'-'Z','a'-'z' and some special chars for specific commands), parameters will be separated by commas.

Message string:
Every command must to be entered as part of message string that begin with **message starting char** and end with **message closing char**, note that string can contain more then one command separated by pipe ("|") char.

Message starting char:
'#' for host command\query.
'~' for machine response.

Device address (Optional, for Knet):
Knet Device ID follow by '@' char.
Query sign = '?', will follow after some commands to define query request.
Message closing char =
Host messages - Carriage Return (ASCII 13), will be referred to by **CR** in this document.
Machine messages - Carriage Return (ASCII 13) + Line-Feed (ASCII 10), will be referred to by **CRLF**.
Spaces between parameters or command parts will be ignored.

Commands chain separator char:
When **message string** contains more than one command, commands will be separated by pipe ("|").

Commands entering:
If terminal software used to connect over serial \ ethernet \ USB port, that possible to directly enter all commands characters (CR will be entered by Enter key, that key send also LF, but this char will be ignored by commands parser).
Sending commands from some controllers (like Crestron) require coding some characters in special form (like \X##). Anyway, there is a way to enter all ASCII characters, so it is possible to send all commands also from controller.
(Similar way can use for URL \ Telnet support that maybe will be added in future).

Commands forms:
Some commands have short name syntax beside the full name to allow faster typing, response is always in long syntax.

Commands chaining:
It is possible to enter multiple commands in same string by '|' char (pipe).
In this case the **message starting char** and the **message closing char** will be entered just one time, in the string beginning and at the end.
All the commands in string will not execute until the closing char will be entered.
Separate response will be sent for every command in the chain.

Input string max length:
64 characters.

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Backward support:
Design note: Transparent support for Protocol 2000 will be implemented by switch Protocol command from Protocol 3000 to Protocol 2000, in Protocol 2000 there is already such a command to switch Protocol to ASCII Protocol (#56 : H38 H80 H83 H81).

Table 12: Instruction Codes for Protocol 3000

Help commands		
Command	**Syntax**	**Response**
Protocol Handshaking	#CR	~OKCRLF

Device initiated messages	
Command	**Syntax**
Start message	Kramer Electronics LTD. , **Device Model** Version **Software Version**
Switcher actions	
Audio-video channel has switched (AFV mode)	**AV** *IN>OUT*
Video channel has switched (Breakaway mode)	**VID** *IN>OUT*
Audio channel has switched (Breakaway mode)	**AUD** *IN>OUT*

Result codes (errors)	
	Syntax
No error. Command running succeeded	COMMAND PARAMETERS **OK**
Protocol Errors	
Syntax Error	ERR001
Command not available for this device	ERR002
Parameter is out of range	ERR003
Unauthorized access (running command without the matching login).	ERR004

Basic routing commands		
Command	**Syntax**	**Response**
Switch audio & video	AV *IN*>*OUT*, *IN*>*OUT*, …	AV *IN*>*OUT*, *IN*>*OUT*,…*RESULT*
Switch video only	VID *IN*>*OUT*, *IN*>*OUT*, … Short form: V *IN*>*OUT*, *IN*>*OUT*, …	VID *IN*>*OUT*, *IN*>*OUT*, …*RESULT*
Note: When AFV mode is active, this command will switch also audio. If audio is breakaway – device display mode will change to show audio connections status.		
Switch audio only	AUD *IN*>*OUT*, *IN*>*OUT*, … Short form: A *IN*>*OUT*, *IN*>*OUT*, …	AUD *IN*>*OUT*, *IN*>*OUT*, …*RESULT*
Note: When AFV mode is active, this command will switch also video.		
Read video connection	VID? *OUT* Short form: V? *OUT* VID? *	VID *IN>OUT* VID *IN*>1, *IN*>2, …

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Read audio connection	AUD? *OUT* Short form: A? *OUT* AUD? *	AUD *IN*>*OUT* AUD *IN*>1, *IN*>2, …

Parameters Description:
IN = Input number or '0' to disconnect output.
'>' = Connection character between in and out parameters.
OUT = Output number or '*' for all outputs.

Examples:		
Switch Video and Audio input 3 to output 7	#AV 3>7**CR**	~AV 3>7 OK**CRLF**
Switch Video input 2 to output 4	#V 2>4**CR**	~VID 2>4 OK**CRLF**
Switch Video input 4 to output 2 in machine number 6	#6@VID 4>2**CR**	~6@VID 4>2 OK**CRLF**
Disconnect Video and Audio Output 4	#AV 0>4**CR**	~AV 0>4 OK**CRLF**
Switch Video Input 3 to All Outputs	#V 3>***CR**	~VID 3>* OK**CRLF**
Chaining Multiple commands*	#AV 1>* | V 3>4, 2>2, 82>1, 0>2 |V 82>3| A 0>1 | V? * **CR** First switch all Audio and video outputs from input 1, **Then switch video input 3 to output 4, video input 2 to output 2, video input and disconnect video output 2.** Then switch audio input 3 to output 2, Then disconnect audio output 1. Then get status of all links (assume this is 4x4 matrix). Commands processing start after entering **CR**, response will sent for each command after processing it.	~AV 1>* OK**CRLF** ~VID 1>2, 3>4 OK**CRLF** ~VID 82>3 **ERR###** **CRLF** ~AUD 0>1 OK**CRLF** ~V 1>1, 0>2, 1>3, 3>4 **CRLF**

Signal Status commands		
Command	**Syntax**	**Response**
Change signal status	----------	**SIGNAL** *INPUT*, *STATUS*
Get signal status	**SIGNAL?** *INPUT*	**SIGNAL** *INPUT*, *STATUS*

Parameters Description:
INPUT = Input number, '*' for all.
STATUS = Signal state:
"0" or "off" for not existent signal.
"1" or "on" for existent signal.

Preset commands		
Command	**Syntax**	**Response**
Store current connections to preset	**PRST-STO** *PRESET* **Short form**: **PSTO** *PRESET*	**PRST-STO** *PRESET* *RESULT*
Recall saved preset	**PRST-RCL** *PRESET* **Short form: PRCL** *PRESET*	**PRST-RCL** *PRESET* *RESULT*
Delete saved preset	**PRST-DEL** *PRESET* **Short form: PDEL** *PRESET*	**PRST-DEL** *PRESET* *RESULT*

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Preset commands		
Command	**Syntax**	**Response**
Read video connections from saved preset	**PRST-VID?** *PRESET*,*OUT* **Short form: PVID?** *PRESET*,*OUT* **PRST-VID?** *PRESET*, *	**PRST-VID** *PRESET*, *IN*>*OUT* **PRST-VID** *PRESET*, *IN*>*1*, *IN*>2,…
Read audio connections from saved preset	**PRST-AUD?** *PRESET*,*OUT* **Short form: PAUD?** *PRESET*,*OUT* **PRST-AUD?** *PRESET*, *	**PRST-AUD** *PRESET*: *IN*>*OUT* **PRST-AUD** *PRESET*: *IN*>**1**, *IN*>**2**,…
Read saved presets list	**PRST-LST?** **Short form: PLST?**	**PRST-LST** *PRESET*, *PRESET*, …
Parameters Description: **PRESET** = Preset number. **OUT** = Output in preset to show for, '*' for all.		

Examples		
Store current Audio & Video connections to preset 5	#PRST-STR 5**CR**	~PRST-STR 5 OK**CRLF**
Recall Audio & Video connections from preset 3	#PRCL 3**CR**	~PRST-RCL 3 OK**CRLF**
Show source of video output 2 from preset 3	#PRST-VID? 3,2**CR**	~PRST-VID 3: 4>2 **CRLF**

Operation commands		
Command	**Syntax**	**Response**
Lock front panel	**LOCK-FP** *LOCK-MODE* **Short form: LCK** *LOCK-MODE*	**LOCK-FP** *LOCK-MODE* *RESULT*
Get front panel locking state	**LOCK-FP?**	**LOCK-FP** *LOCK-MODE*
Parameters Description: **LOCK-MODE = ** Front panel locking state: "0" or "off" to unlock front panel buttons. "1" or "on" to lock front panel buttons.		
Restart device	**RESET**	**RESET OK**
Switch to Protocol 2000*	**P2000**	**P2000 OK**
* Protocol 2000 has command to switch back to ASCII Protocol (like Protocol 3000)		

Audio parameters commands		
Command	**Syntax**	**Response**
Set audio level in specific amplifier stage.	**AUD-LVL** *STAGE*, *CHANNEL*, *VOLUME* **Short form: ADL** *STAGE*, *CHANNEL*, *VOLUME*	**AUD-LVL** *STAGE*, *CHANNEL*, *VOLUME* *RESULT*

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Read audio volume level	**AUD-LVL?** *STAGE*, *CHANNEL* **Short form: ADL?** *STAGE*	**AUD-LVL** *STAGE*, *CHANNEL*, *VOLUME*

Parameters Description:

STAGE =
"In","Out"
or
Numeric value (present audio processing stage). For example: "0" for Input level, "1" for Pre-Amplifier, "2" for Amplifier (Out) etc.

CHANNEL = Input or Output #

VOLUME = Audio parameter in Kramer units, precede minus sign for negative values.
++ increase current value,
-- decrease current value.

MUTE MODE = 1 – Mute
0 – Unmute

Machine info commands		
Command	**Syntax**	**Response**
* Time settings commands require admin authorization		
Read in\outs count	**INFO-IO?**	**INFO-IO: IN** *INPUTS_COUNT*, **OUT** *OUTPUTS_COUNT*
Read max presets count	**INFO-PRST?**	**INFO-PRST: VID** *PRESET_VIDEO_COUNT*, **AUD** *PRESET_AUDIO_COUNT*
Reset configuration to factory default	**FACTORY**	**FACTORY** *RESULT*
Mute Audio	**MUTE** **MUTE MODE**	**MUTE** **MUTE MODE** **RESULT**

Identification commands		
Command	**Syntax**	**Response**
Protocol Handshaking	#**CR**	**~OK** **CRLF**
Read device model	**MODEL?**	**MODEL** *MACHINE_MODEL*
Read device serial number	**SN?**	**SN** *SERIAL_NUMBER*
Read device firmware version	**VERSION?**	**VERSION** *MAJOR*.*MINOR*.*BUILD*.*REVISION*
Set machine name	**NAME** *MACHINE_NAME*	**NAME** *MACHINE_NAME* *RESULT*
Read machine name	**NAME?**	**NAME** *MACHINE_NAME*
Reset machine name to factory default*	**NAME-RST**	**NAME-RST** *MACHINE_FACTORY_NAME* *RESULT*
*Note: machine name not equal to model name. This name relevance for site viewer identification of specific machine or for network using (with DNS feature on).		

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Identification commands		
Command	**Syntax**	**Response**
MACHINE_NAME = Up to 14 Alfa-Numeric chars. * **Machine factory name =** Model name + last 4 digits from serial number.		
Set machine id number	**MACH-NUM** *MACHINE_NUMBER*	**MACH-NUM** *OLD_MACHINE_NUMBER* ,*NEW_MACHINE_NUMBER* *RESULT*
* Response will send after machine number has been changed. So the replay with header will be: *NEW_MACHINE_NUMBER* @**MACH-NUM** *OLD_MACHINE_NUMBER* ,*NEW_MACHINE_NUMBER* **OK**		

Network settings commands		
Set IP Address	**NET-IP** *IP_ADDRESS* **NTIP**	**NET-IP** *IP_ADDRESS* *RESULT*
Read IP Address	**NET-IP?** **NTIP**?	**NET-IP** *IP_ADDRESS*
Read MAC Address	**NET-MAC?** **NTMC**	**NET-MAC** *MAC_ADDRESS*
Set subnet mask	**NET-MASK** *SUBNET_MASK* **NTMSK**	**NET-MASK** *SUBNET_MASK* *RESULT*
Read subnet mask	**NET-MASK?** **NTMSK?**	**NET-MASK** *SUBNET_MASK*
Set gateway address	**NET-GATE** *GATEWAY_ADDRESS* **NTGT**	**NET-GATE** *GATEWAY_ADDRESS* *RESULT*
Read subnet mask	**NET-GATE?** **NTGT?**	**NET-GATE** *GATEWAY_ADDRESS*
Set DHCP mode	**NET-DHCP** *DHCP_MODE* **NTDH**	**NET-DHCP** *DHCP_MODE* *RESULT*
Read subnet mask	**NET-DHCP?** **NTDH?**	**NET-DHCP** *DHCP_MODE*
DHCP_MODE = 0 – Don't use DHCP (Use IP set by factory or IP set command). 1 – Try to use DHCP, if unavailable use IP as above.		
Change protocol ethernet port	ETH-PORT *PROTOCOL* , *PORT* ETHP	ETH-PORT *PROTOCOL* ,*PORT* *RESULT*
Read protocol ethernet port	ETH-PORT? *PROTOCOL* ETHP?	ETH-PORT *PROTOCOL* , *PORT*
PROTOCOL = TCP / UDP (transport layer protocol) *PORT* = ethernet port to enter protocol 3000 commands. 1-65535 = User defined port 0 - reset port to factory default (50000 for UDP, 5000 for TCP)		

Advanced switching commands		
Command	Syntax	Response
Set audio follow video mode	AFV *AFV-MODE*	AFV *AFV-MODE* *RESULT*

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Note: This command effect device front-panel mode and AUD\VID command.		
Read audio follow video mode	AFV?	AFV *AFV-MODE*

AFV-MODE = Front panel AFV mode
"0" or "afv" to set front panel switching buttons in audio-follow-video state.
"1" or "brk" to set front panel switching buttons in their previous state when audio.

16.3 Kramer Protocol 2000

This RS-232/RS-485 communication protocol uses four bytes of information as defined below. The default data rate is 9600 baud, with no parity, 8 data bits and 1 stop bit.

Table 13: Protocol Definitions

	MSB							LSB
	DESTI-NATION	**INSTRUCTION**						
0	D	N5	N4	N3	N2	N1	N0	
7	6	5	4	3	2	1	0	
1st byte								
	INPUT							
1	I6	I5	I4	I3	I2	I1	I0	
7	6	5	4	3	2	1	0	
2nd byte								
	OUTPUT							
1	O6	O5	O4	O3	O2	O1	O0	
7	6	5	4	3	2	1	0	
3rd byte								
			MACHINE NUMBER					
1	OVR	X	M4	M3	M2	M1	M0	
7	6	5	4	3	2	1	0	
4th byte								

1st BYTE: Bit 7 – Defined as 0.
D – "DESTINATION": 0 - for sending information to the switchers (from the PC);
1 - for sending to the PC (from the switcher).
N5…N0 – "INSTRUCTION"
The function that is to be performed by the switcher(s) is defined by the INSTRUCTION (6 bits). Similarly, if a function is performed via the machine's keyboard, then these bits are set with the INSTRUCTION NO., which was performed. The instruction codes are defined according to the table below (INSTRUCTION NO. is the value to be set for N5…N0).

2nd BYTE: Bit 7 – Defined as 1.
I6…I0 – "INPUT".
When switching (ie. instruction codes 1 and 2), the INPUT (7 bits) is set as the input number which is to be switched. Similarly, if switching is done via the machine's front-panel, then these bits are set with the INPUT NUMBER which was switched. For other operations, these bits are defined according to the table.

3rd BYTE: Bit 7 – Defined as 1.
O6…O0 – "OUTPUT".
When switching (ie. instruction codes 1 and 2), the OUTPUT (7 bits) is set as the output number which is to be switched. Similarly, if switching is done via the machine's front-panel, then these bits are set with the OUTPUT NUMBER which was switched. For other operations, these bits are defined according to the table.

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4th BYTE: Bit 7 – Defined as 1.
Bit 5 – Don't care.
OVR – Machine number override.
M4…M0 – MACHINE NUMBER.

Used to address machines in a system via their machine numbers. When several machines are controlled from a single serial port, they are usually configured together with each machine having an individual machine number. If the OVR bit is set, then all machine numbers will accept (implement) the command, and the addressed machine will reply.

For a single machine controlled via the serial port, always set M4…M0 = 1, and make sure that the machine itself is configured as MACHINE NUMBER = 1.

Table 14: Instruction Codes for Protocol 2000

Note: All values in the table are decimal, unless otherwise stated.

INSTRUCTION		DEFINITION FOR SPECIFIC INSTRUCTION		NOTE
#	DESCRIPTION	INPUT	OUTPUT	
0	RESET VIDEO	0	0	1
1	SWITCH VIDEO	Set equal to video input which is to be switched (0 = disconnect)	Set equal to video output which is to be switched (0 = to all the outputs)	2
2	SWITCH AUDIO	Set equal to audio input which is to be switched (0 = disconnect)	Set equal to audio output which is to be switched (0 = to all the outputs)	2
3	STORE VIDEO STATUS	Set as SETUP #	0 - to store 1 - to delete	2, 3
4	RECALL VIDEO STATUS	Set as SETUP #	0	2, 3
5	REQUEST STATUS OF A VIDEO OUTPUT	Set as SETUP #	Equal to output number whose status is reqd	4, 3
6	REQUEST STATUS OF AN AUDIO OUTPUT	Set as SETUP #	Equal to output number whose status is reqd	4, 3
8	BREAKAWAY SETTING	0	0 - audio-follow-video 1 - audio breakaway	2
11	REQUEST BREAKAWAY SETTING	Set as SETUP #	0 - Request audio breakaway setting	3, 4, 6
15	REQUEST WHETHER SETUP IS DEFINED / VALID INPUT IS DETECTED	SETUP # or Input #	0 - for checking if setup is defined 1 - for checking if input is valid	8
16	ERROR / BUSY	For invalid / valid input (i.e. OUTPUT byte = 4 or OUTPUT byte = 5), this byte is set as the input #	0 - error 1 - invalid instruction 2 - out of range 3 - machine busy 4 - invalid input 5 - valid input 6 - RX buffer overflow	9, 25
22	SET AUDIO PARAMETER	Equal to input / output number whose parameter is to be set (0 = all)	Set as parameter value	2, 24
24	INCREASE / DECREASE AUDIO PARAMETER	Equal to input / output number whose parameter is to be increased / decreased (0 = all)	0 - increase output 1 - decrease output 2 - increase left output 3 - decrease left output 4 - increase right output 5 - decrease right output 6 - increase input 7 - decrease input 8 - increase left input 9 - decrease left input 10 -increase right input 11 - decrease right input	2

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INSTRUCTION		DEFINITION FOR SPECIFIC INSTRUCTION		NOTE
#	DESCRIPTION	INPUT	OUTPUT	
25	REQUEST AUDIO PARAMETER	Equal to input / output number whose parameter is requested	0	6, 24
30	LOCK FRONT PANEL	0 - Panel unlocked 1 - Panel locked	0	2
31	REQUEST WHETHER PANEL IS LOCKED	0	0	16
42	AUDIO PARAMETER SETTINGS FOR INSTRUCTIONS 22, 24, 25	INPUT Bit: I0 - 0=input; 1=output I1 - Left I2 - Right	0 - Gain 1 - Bass 2 - Treble 3 - Midrange 4 - Mix On	24
56	CHANGE TO ASCII	0	Kramer protocol 3000	19
61	IDENTIFY MACHINE	1 - video machine name 2 - audio machine name 3 - video software version 4 - audio software version	0 - Request first 4 digits 1 - Request first suffix 2 - Request second suffix 3 - Request third suffix 10 - Request first prefix 11 - Request second prefix 12 - Request third prefix	13
62	DEFINE MACHINE	1 - number of inputs 2 - number of outputs 3 - number of setups	1 - for video 2 - for audio	14

NOTES on the above table:

NOTE 1 - When the master switcher is reset, (e.g. when it is turned on), the reset code is sent to the PC. If this code is sent to the switchers, it will reset according to the present power-down settings.

NOTE 2 - These are bi-directional definitions. That is, if the switcher receives the code, it will perform the instruction; and if the instruction is performed (due to a keystroke operation on the front panel), then these codes are sent. For example, if the HEX code

01 85 88 83

was sent from the PC, then the switcher (machine 3) will switch input 5 to output 8. If the user switched input 1 to output 7 via the front panel keypad, then the switcher will send HEX codes:

41 81 87 83

to the PC.

When the PC sends one of the commands in this group to the switcher, then, if the instruction is valid, the switcher replies by sending to the PC the same four bytes that it was sent (except for the first byte, where the DESTINATION bit is set high).

NOTE 3 - SETUP # 0 is the present setting. SETUP # 1 and higher are the settings saved in the switcher's memory, (i.e. those used for Store and Recall).

NOTE 4 - The reply to a "REQUEST" instruction is as follows: the same instruction and INPUT codes as were sent are returned, and the OUTPUT is assigned the value of the requested parameter. The replies to instructions 10 and 11 are as per the definitions in instructions 7 and 8 respectively. For example, if the present status of machine number 5 is breakaway setting, then the reply to the HEX code

0B 80 80 85

would be HEX codes

4B 80 81 85

NOTE 6 – If INPUT is set to 127 for these instructions, then, if the function is defined on this machine, it replies with OUTPUT=1. If the function is not defined, then the machine replies with OUTPUT=0, or with an error (invalid instruction code).

If the INPUT is set to 126 for these instructions, then, if possible, the machine will return the current setting of this function, even for the case that the function is not defined. For example, for a video switcher which always switches during the VIS of input #1, (and its VIS setting cannot be programmed otherwise), the reply to the HEX code

0A FE 80 81 (ie. request VIS setting, with INPUT set as 126dec)

would be HEX codes

4A FE 81 81 (ie. VIS setting = 1, which is defined as VIS from input #1).

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NOTE 8 - The reply is as in TYPE 3 above, except that here the OUTPUT is assigned with the value 0 if the setup is not defined / no valid input is detected; or 1 if it is defined / valid input is detected.

NOTE 9 - An error code is returned to the PC if an invalid instruction code was sent to the switcher, or if a parameter associated with the instruction is out of range (e.g. trying to save to a setup greater than the highest one, or trying to switch an input or output greater than the highest one defined). This code is also returned to the PC if an RS-232 instruction is sent while the machine is being programmed via the front panel. Reception of this code by the switcher is not valid.
NOTE 10 – This code is reserved for internal use.

NOTE 13 - This is a request to identify the switcher/s in the system. If the OUTPUT is set as 0, and the INPUT is set as 1, 2, 5 or 7, the machine will send its name. The reply is the decimal value of the INPUT and OUTPUT. For example, for a 2216, the reply to the request to send the audio machine name would be (HEX codes):

7D 96 90 81 (i.e. 128dec+ 22dec for 2nd byte, and 128dec+ 16dec for 3rd byte).

If the request for identification is sent with the INPUT set as 3 or 4, the appropriate machine will send its software version number. Again, the reply would be the decimal value of the INPUT and OUTPUT - the INPUT representing the number in front of the decimal point, and the OUTPUT representing the number after it. For example, for version 3.5, the reply to the request to send the version number would be (HEX codes):

7D 83 85 81 (i.e. 128dec+ 3dec for 2nd byte, 128dec+ 5dec for 3rd byte).

If the OUTPUT is set as 1, then the ASCII coding of the lettering following the machine's name is sent. For example, for the VS-7588YC, the reply to the request to send the first suffix would be (HEX codes):

7D D9 C3 81 (i.e. 128dec+ ASCII for "Y"; 128dec+ ASCII for "C").

NOTE 14 - The number of inputs and outputs refers to the specific machine which is being addressed, not to the system. For example, if six 16X16 matrices are configured to make a 48X32 system (48 inputs, 32 outputs), the reply to the HEX code
3E 82 81 82 (ie. request the number of outputs)
would be HEX codes
7E 82 90 82
ie. 16 outputs

NOTE 16 - The reply to the "REQUEST WHETHER PANEL IS LOCKED" is as in NOTE 4 above, except that here the OUTPUT is assigned with the value 0 if the panel is unlocked, or 1 if it is locked.

NOTE 19 – After this instruction is sent, the unit will respond to the ASCII command set defined by the OUTPUT byte. The ASCII command to operate with the HEX command set must be sent in order to return to working with HEX codes.

NOTE 24 – Further information needed in instructions 21, 22, 25 and 26, is sent using instruction 42 – which is sent prior to the instruction. For example, to request the audio gain value of right input # 9, send hex codes

2A 84 80 81
and then send HEX codes
19 89 81 81.
To set MIX mode, send hex codes
2A 81 84 81
and then send HEX codes
16

NOTE 25 – For units which detect the validity of the video inputs, Instruction 16 will be sent whenever the unit detects a change in the state of an input (in real-time).
For example, if input 3 is detected as invalid, the unit will send the HEX codes

10 83 84 81
If input 7 is detected as valid, then the unit will send HEX codes
10 87 85 81.

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Caution

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